NLMK

SUSTAINABILITY
REPORT
2022

Environmental protection

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CLIMATE CHANGE

KEY FIGURES FOR 2022	MATERIAL TOPICS
1.78 t of CO_2-equivalent per tonne of Fe (Scope 1 + Scope 2, market-based method) **-1.8 m t** of CO_2 through implemented projects (Scope 1 + Scope 2) and purchase of low carbon energy **-50 kg** of coal/t of hot metal through activities undertaken since 2010 **-560 m t** of CO_2 of avoided emissions for consumers of NLMK Group products[1]	• Climate change • Air emissions

Material topics and Key events table continued:

KEY EVENTS IN 2022

• In-depth assessment was carried out for climate change-related risks at Stoilensky
• Low-carbon energy procurement enabled a 5% reduction of Scope 1+2 emissions for the Russian sites
• Evaluation of CO_2 sequestration potential was done in cooperation with the Institute of Global Climate and Ecology for forest ecosystems of the Lipetsk Region

NLMK Group is fully committed to climate change action and takes meaningful steps towards decreasing greenhouse gas emissions, progressively reducing the carbon footprint of its products. Moreover, the Company's products (such as steel for wind energy and energy-efficient electrical steels) enable a broad range of consumer industries to reduce their climate impact substantially. Emissions avoided with NLMK's products are comparable to emission volumes from the entire steelmaking operations of the Group.

On average steel produced by NLMK Group consists of 30–35% of recycled resources such as ferrous scrap and other materials that are climate neutral and can significantly reduce the Company's carbon footprint. Specific CO_2 emissions from scrap steelmaking are approximately four times lower than when using primary raw materials.

In 2023, NLMK Group published its third report in line with the revised recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)[2] from 2021.

Our approach to managing climate change-related issues

The Company's leadership devotes continued attention to climate-related issues, which are embedded into its corporate governance system.

[TCFD Governance a)] [GRI 2-12] The agenda of the BoD meetings includes such issues as the decarbonization strategy, climate projects, climate risks, methodology and benchmarking, progress towards achieving the goals. The Board of Directors Strategic Planning Committee determines climate impact reduction goals.

[TCFD Governance b)] Goals related to climate impact reduction are assigned by the CEO (Chairman of the Management Board) to the functional divisional managers of the Group, as well as the heads of production divisions at NLMK Group companies. The Company evaluates progress towards achieving the goals annually.

NLMK Group's management devotes particular attention to climate aspects when considering the Company's strategy, risk management, annual budget, and business plans, as well as when setting the Company's business goals and monitoring the implementation and efficiency of major investments.

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1   Avoided emission is calculated for the entire product lifecycle based on the estimated sales volume over the 2018–2023 strategic cycle.

2   The Task Force on Climate-related Financial Disclosures (TCFD) was established in December 2015 by the Financial Stability Board (FSB), an international body established by the G20 states. In October 2021, the TCFD published its revised recommendations, which set out the basic principles of climate-related disclosures for companies and organizations.

For more information on climate-related issues, please visit the Company website.

Adaptation to climate change

The CO_2 reduction potential for BF-BOF steelmaking, given the existing technology and possible advancements, is limited to 5–15% of the current levels (excluding carbon capture, utilization, and storage[3]). More significant reductions can be achieved through transition from coal to "green" hydrogen and switch to the HBI+EAF process (hot-briquetted iron + electric arc furnace).

In 2021, NLMK Group adopted its Climate Programme that envisages a phased transition to the electric arc method of steel production based on DRI/HBI as feedstock (coke-free iron ore with a high iron content). Even with the current energy consumption structure, the above route allows for a twofold reduction of CO_2 emissions compared to the BF-BOF route. Going forward, when sufficient volumes of "green" hydrogen and industrialized technologies of hydrogen-based reduction become available, the decarbonization potential of the process should exceed 90% (vs. the current levels). In light of the current restrictions on access to HBI technologies, the timeline of the programme will be determined at a later date.

In 2022, the Company continued to pursue research in alternative steelmaking techniques, carbon capture, utilization and storage, use of hydrogen and syngas, biofuel, wind and solar power generation, CO_2 sequestration in forests.

Stoilensky has completed its key projects aimed at increasing iron content in concentrate, which will enable an annual reduction of CO_2 emissions by 800,000 tonnes. Further investment projects and operational improvements implemented within the current strategic cycle are contributing to the reduction of specific CO_2 emissions as well.

In 2022, NLMK Lipetsk carried out the following operational activities: partial replacement of lime with recycled BOF slag and more intensive usage of purchased scrap in sinter production. These measures that leverage recycled materials reduce direct CO_2 emissions by 30,000 tonnes per year. Furthermore, the Company pursues other projects in its sintering, melting, rolling and energy operations, including the construction of a power plant for recovery of secondary fuel gases. Commissioning of the recovery co-generation plant will reduce CO_2 emissions by 650,000 tonnes per year (or by 35 kg of CO_2 per tonne of steel).

Also in 2022, an in-depth assessment of physical risks was performed for Stoilensky. It translated into an action plan to adapt the site to adverse climate conditions and weather events.

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3   Though CO_2 capturing technologies are available, none of them is commercially viable for large volumes of greenhouse gases. Such projects require significant CAPEX and OPEX.

In 2022, the Group began the development of a climate strategy for the companies in its NBH joint venture companies. Considerations include ways to improve efficiency of natural gas use in reheating furnaces, switch to induction heating, use of renewable electricity, etc.

NLMK DanSteel (Denmark) completed the construction of a new and efficient reheating furnace for slabs in 2022. Performance tests have shown that the reduction of CO_2 emissions relative to the old furnaces is 18%. The average annual effect, including a calculation in absolute terms, will be determined after the 2023 run.

NLMK Pennsylvania continued to build its new reheating furnace for slabs in 2022. The new furnace should deliver natural gas savings of up to 30%.

LONG-TERM CO₂ REDUCTION GOALS

NLMK Group's long-term decarbonization strategy assumes the replacement of the Blast Furnace-Basic Oxygen Furnace steel production process with low-carbon technologies by 2050. A phase-in process will be timed to blast furnace overhaul schedules and other technology constraints.

NLMK Group has set long-term goals to reduce specific emissions (Scope 1+2) by 2050 to 1.2 t CO_2/t of steel (- 40% of the current intensity) with a full transition to HBI+EAF using the Group's captive iron ore, as well as procurement of natural gas and electricity at current levels of carbon intensity.

When the industrialized hydrogen-based iron reduction technologies come along and sufficient amounts of low-carbon electricity become available, the new process chain will reduce the Group's carbon intensity to 0.2 t CO_2/t of steel (90% reduction vs. 2023). The remaining emissions can be reduced to zero through CO_2 capture projects or offset by absorption projects.

Thus, when the necessary external conditions allow it, NLMK Group aims to achieve carbon neutrality.

NLMK Group continues to advance its low-carbon energy consumption

Increasing the share of low-carbon energy sources is one of NLMK Group's priority initiatives aimed at reducing its carbon footprint. Nuclear energy is one of the main decarbonization tools, currently accounting for a third of global low-carbon electricity production.

In 2022, NPPs supplied 4.5 billion kWh to NLMK Group sites enabling the Company to cut 1.6 million tonnes of CO_2 Scope 2 emissions.

Metrics and targets

During this reporting period, the Company has prepared its Russian sites to submit statutory reports on greenhouse gases for 2022. The submission becomes mandatory starting from 2023. The Group's NBH companies (under EU ETS) and American companies have been submitting mandatory annual reports on GHG for many years. Mandatory reporting has certain limitations and differs from the voluntary GHG disclosures published in this report.

CO₂ emission per tonne of hot metal under the EU ETS methodology

CO_2 emission per tonne of hot metal at NLMK Lipetsk over 2022, calculated under the EU methodology for emission allowance allocation, was 1.41 t CO_2/t. This is significantly better than the average level of emission by European steelmakers at 1.49 t CO_2/t (cf. the emission level of Europe's top 10% low emitters among the steel companies is 1.36 t CO_2/t).[4]

Direct and indirect energy GHG emissions of NLMK Group, '000 t of CO₂-equivalent
[GRI 305-1] [GRI 305-2] [TCFD Metrics and targets b)]

Indicator	2018*	2019	2020	2021	2022
Direct GHG emissions (Scope 1)	31,232	28,601	30,036	30,436	29,288
Carbon dioxide (CO₂)	31,158	28,531	29,964	30,365	29,220
including from stationary sources	*30,956*	*28,311*	*29,753*	*30,151*	*29,013*
Methane (CH₄)	46	42	44	44	42
Nitrogen oxide (N₂O)	28	28	28	28	27
Indirect energy emissions (Scope 2)[5], location-based	2,832	2,546	2,458	2,698	2,485
Indirect energy emissions (Scope 2)[6], market-based	**2,871**	**2,586**	**2,502**	**1,711**	**970**
Total (Scope 1 + Scope 2), location-based	34,064	31,147	32,494	33,134	31,773
including CO₂ for stationary sources (location-based)	*33,785*	*30,854*	*32,210*	*32,847*	*31,496*
Total (Scope 1 + Scope 2), market-based	34,103	31,187	32,537	32,147	30,258
including CO₂ for stationary sources (market-based)	*33,824*	*30,893*	*32,253*	*31,860*	*29,981*
CO₂ emission from biomass combustion (Scope 1, for reference)	17	25	25	26	29

* The baseline year for all Scopes is the year when Strategy 2022 was launched. **[GRI 305-1] [GRI 305-2]**

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4   According to Eurofer data.

5   Emissions from fuel combustion in the production of electricity received from the external grid for the needs of the Group's sites. The calculation was made using the location-based method: by the average weighted rates of greenhouse gas emissions produced at a certain territory (country, region, state). For the Group's sites in the United States, CH₄ and N₂O emissions are taken into account in addition to CO₂. **[GRI 305-2]**

6   Emissions related to supplies of external electricity, based on free contracts of electricity sales and purchase. For the Group's sites in the United States, CH₄ and N₂O emissions are taken into account in addition to CO₂ (no contract instruments used). **[GRI 305-2]**

NLMK Group GHG emission trends (Scope 1 + Scope 2, market-based), m t of CO_2-equivalent

- ■ Indirect energy GHG emission (Scope 2), market-based
- ■ Direct GHG emission (Scope 1)
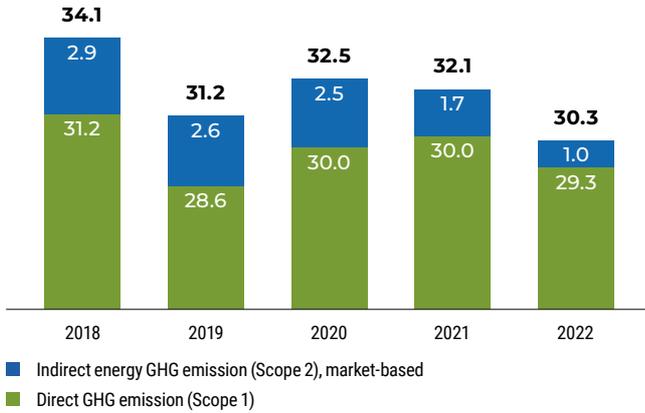
Blast furnace operations (51%), energy production (14%) and iron ore production (10%) are the largest contributors to direct greenhouse gas emissions (Scope 1). The overall contribution of additionally calculated emissions from mobile units and emission of CH_4 and N_2O into NLMK Group's total direct GHG emissions is less than 1% in CO_2-equivalent.

NLMK Group regularly estimates CO_2 emissions from biomass combustion (wood chips and charcoal), which is used at NLMK Lipetsk for ferroalloy production. These emissions are climate-neutral, provided for reference only, and not included in the overall emissions volume. The rates of biomass use went up in 2022. The Company is currently considering the prospects of using sustainable biomass in its key steelmaking processes. The charcoal supplied to the Company is FSC certified[7].

Direct GHG emissions structure (Scope 1) of NLMK group, by type of source, 2022[8], %

- ■ Blast furnace operations
- ■ Energy production
- ■ Production of iron ore raw materials
- ■ BOF operations
- ■ Coke production
- ■ Lime production
- ■ Rolling operations
- ■ EAF operations
- ■ Mobile sources
- ■ Ferroalloy production
- ■ Other stationary sources
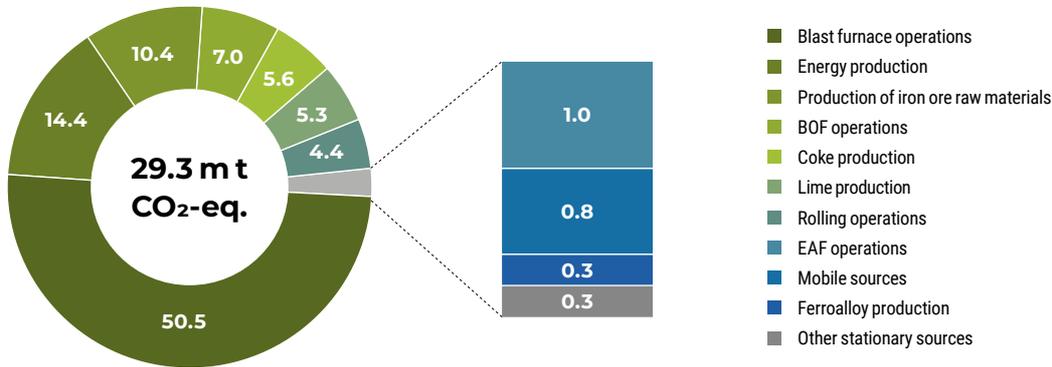
Total direct and indirect energy emissions by country in 2022 (Scope 1 + Scope 2, market-based), '000 t CO_2-equivalent.

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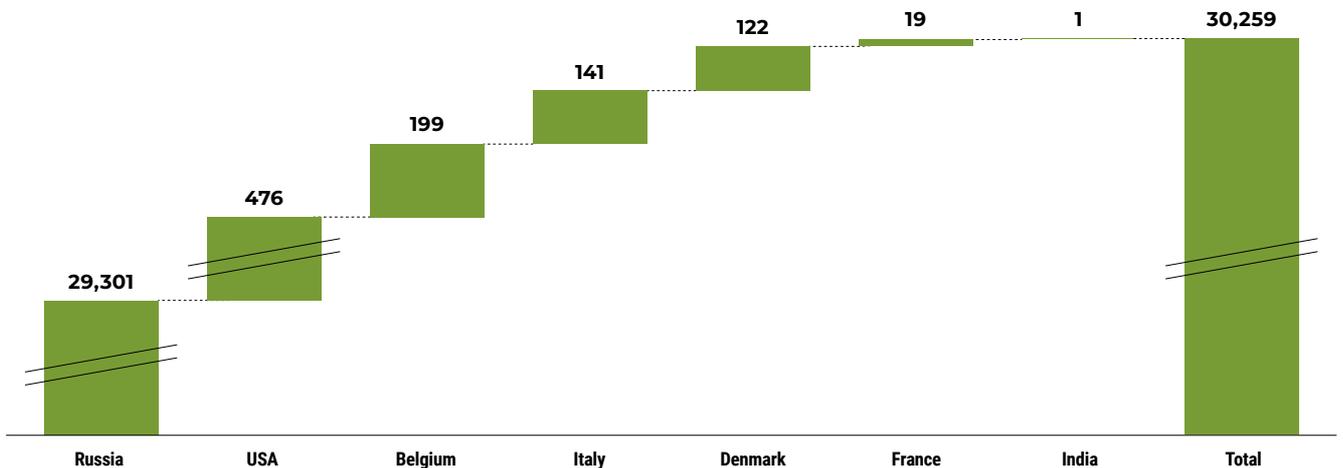
7 Forest Stewardship Council.

8 CO_2 emissions from combustion of process gases (blast furnace and coke gas) outside the sources where these gases are formed, but within Group sites are taken as equal to emissions from combustion of an energy-equivalent amount of natural gas, adjusted for combustion efficiency. The corresponding CO_2 deduction is made for process gas sources. The "Energy resources production" category includes emissions generated by production of heat, electricity, and technical gases.

The Company continues to assess other indirect greenhouse gas emissions associated with the production of the main types of external resources used by NLMK Group companies (upstream emissions) and their delivery to the companies' gates, as well as the transportation of raw materials and semi-finished products between Group companies[9]. Estimated coverage is at least 95%. For purchased electricity, Scope 3 includes emissions related to fuel production, processing, and delivery, as well as losses in networks during electricity transmission. Scope 3 includes emissions of methane and nitrous oxide as well as carbon dioxide.

The Company works with suppliers to obtain information about the carbon footprint associated with the purchased products. The calculations rely on specific CO_2 emission data for rail cargo transportation within Russia, provided by the largest rail operator. The assessment of specific emissions from natural gas production and transportation within Russia relies on data provided by the largest gas market players.

Upstream GHG emissions (Scope 3), m t of CO_2-equivalent [GRI 305-3] [TCFD Metrics and targets b)]

2018	2019	2020	2021	2022
7.9	8.8	7.6	8.4	7.6
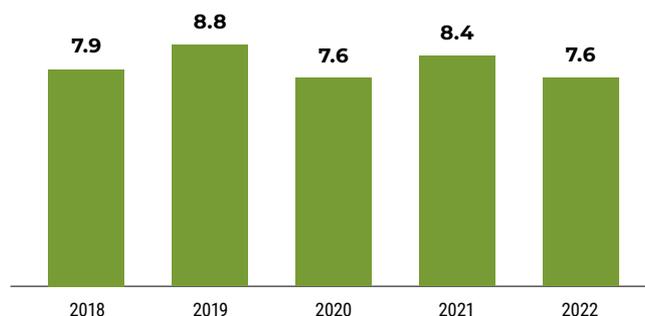
Coal accounts for the largest part of other indirect emissions at 33% of the total. The category consists mostly of methane emissions in coal mining.

Other indirect GHG emissions (Scope 3) upstream along the value chain by major category, 2022, % [GRI 305-3]
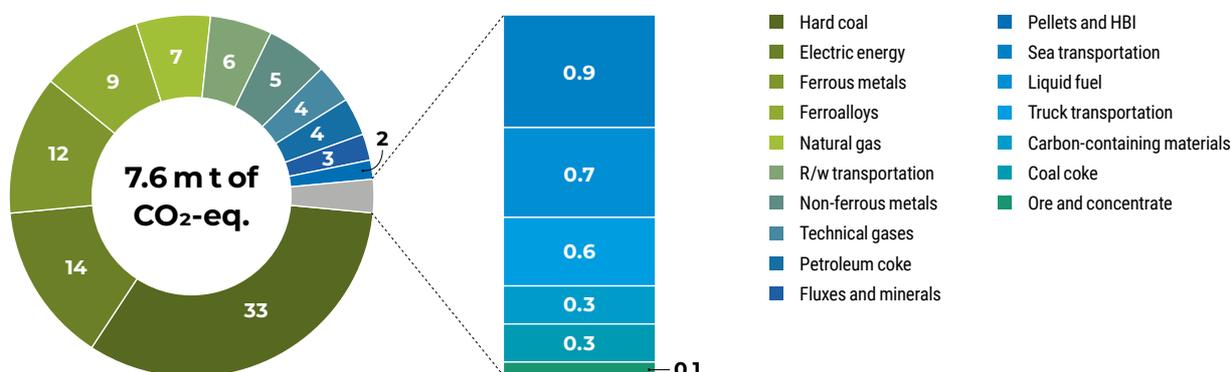
Specific CO_2 emission from stationary sources[10], t CO_2 equivalent / t [GRI 305-4]

Indicator	2018	2019	2020	2021	2022
Specific direct emissions (Scope 1):					
per tonne of Fe	1.72	1.77	1.74	1.69	1.72
per tonne of steel	1.77	1.80	1.88	1.73	1.77
Specific indirect energy emissions (Scope 2, location-based):					
per tonne of Fe	0.16	0.16	0.14	0.15	0.15
per tonne of steel	0.16	0.16	0.16	0.15	0.15
Specific indirect energy emissions (Scope 2, market-based):					
per tonne of Fe	0.16	0.16	0.15	0.10	0.06
per tonne of steel	0.16	0.16	0.16	0.10	0.06
Specific total emissions (Scope 1 + Scope 2, location-based):					
per tonne of Fe	1.87	1.92 (1.87)*	1.89 (1.86)*	1.84	1.87
per tonne of steel	1.93	1.97 (1.93)*	2.03 (1.91)*	1.89	1.92
Specific total emissions (Scope 1 + Scope 2, market-based):					
per tonne of Fe	1.88	1.93 (1.88)*	1.89 (1.86)*	1.78	1.78
per tonne of steel	1.93	1.97 (1.93)*	2.04 (1.91)*	1.83	1.83

* Specific emissions excluding the transient impacts due to decreased production.

9   Emissions from production of semi-products manufactured within the Group are not taken into account in this category, since they are already accounted for in Scopes 1 and 2. This category excludes also the transport emissions during delivery to customers.

10   In line with the corporate approach to determining CO_2 emission targets: CO_2 only, stationary sources only.

In addition to the commonly applied industry indicator — specific emissions per tonne of steel — calculations were carried out per tonne of end-product iron output (Fe), which is generally taken as the sum total of iron contained in the output of steel and commercial pig iron[11] (and, looking forward, in commercial HBI).

According to the Scope 2 location-based calculation, specific emissions in 2022 vs. 2021 went up by 2% and remained flat vs. the baseline of 2018. The increase relative to 2021 came from the increased share of BOF steel in total output of the Group, from 77% to 79%. According to the Scope 2 market-based calculation, specific emissions in 2022 vs. 2021 remained flat and went down 5% relative to the baseline of 2018, driven by procurement of carbon-free energy by Russian sites.

Specific CO_2 emission trends (Scope 1 + Scope 2, market-based) from stationary sources, t/t of Fe
[GRI 305-4]
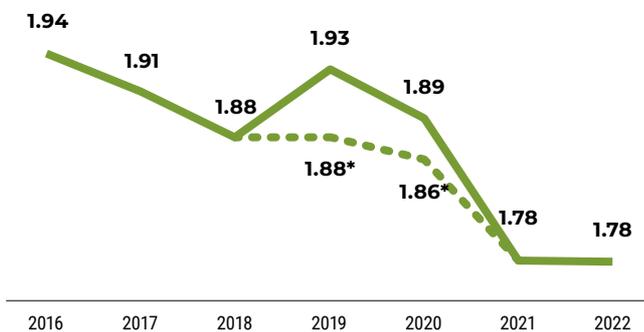
*Specific emission without the impact of temporary factors, which have to do with lower production.

NLMK Group reduces climate footprint through use of hydrogen-containing secondary resources

Steelmaking processes of NLMK Group generate by-product gases that are recycled as fuel for power generation or directly as energy supply for core process equipment. This arrangement reduces the consumption of fossil fuels and the emission of GHG by 3.4 million tonnes CO_2 per year.

Some of the blast furnace gas is fed into top recovery turbines that generate additional power without any fuel combustion. The total captive power generation covers 2/3 of demand at NLMK Lipetsk.

By-product gases also contain pure hydrogen: from 7% in blast furnace gas to 60% in coke oven gas. Hydrogen utilization further reduces the consumption of carbon-based fossil fuels. In 2022, NLMK Group consumed 19 billion m3 of blast furnace and coke oven gas (annual), which contains approximately 2.5 billion m³ of hydrogen.

Consistent efforts are undertaken to reduce the Company's environmental footprint. From 2010 to 2022, emissions of CO_2 per tonne of end-product iron output went down by 13% across the Group and by 9% at NLMK's flagship production site in Lipetsk. The two main contributing factors in this outcome were higher operational efficiency of production and higher share of electric arc furnace output.

[TCFD Metrics and targets c)] The 2023 target for specific CO_2 emission per tonne of steel (Scope 1 + Scope 2) is 1.91 t/t, down from 2.00 t/t in the baseline year of 2018 (a 5% decrease); the target per tonne of Fe is 1.87 t/t vs. 1.94 t/t in 2018 (a 4% decrease); the target per tonne of steel and commercial pig iron is 1.84 t/t vs. 1.92 t/t in 2018.

NLMK Group continues to develop and implement projects aimed at GHG emission reduction. These rely on proven current techniques to improve energy efficiency and reduce fuel consumption, as well as on some innovative solutions. The latter include recycling of carbon resources and use of biofuels in blast furnace operations and innovative CCUS technologies.

Key CO_2 reductions were achieved by the projects implemented in 2019–2021. The Company carried out a number of additional projects in 2022 that enabled a significant reduction of CO_2 emissions (Scope 1 and Scope 2). These included projects to increase iron content in concentrate and to expand recycling. In this reporting period, the Company began calculating Scope 3 emissions for its projects. In addition to CO_2 emissions, this accounts for CH_4 from coal and natural gas.

[GRI 305-5] The evaluation of project effects over the time period in question compared technical effects against a business-as-usual scenario (baseline). A custom model was applied to projects that affect sintering and ironmaking operations. The model uses an end-to-end calculation of resource consumption per tonne of iron along the entire value chain and accounts for the interdependencies among the projects. Separate calculations were carried out for projects in steelmaking and rolling operations and power generation.

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11   Specific emissions per tonne of steel are disclosed in any case.

Reduction of CO_2 emissions by projects contributing to NLMK Group strategic target through 2023 **[GRI 305-5]**

Reduction of GHG emissions:	Scope 1	Scope 2	Scope 3	Scope 1+2	Scope 1+2+3
- abs. terms, '000 t CO_2 eq.	-100	-104	-97	-205	-301
- specific, kg CO_2 eq./t of steel	-6.1	-6.4	-5.9	-12.5	-18.3

NLMK Group target for reduction of specific CO_2 emissions from stationary sources (Scope 1 + Scope 2) within the current strategic cycle through to 2023, w/o the change of indirect emission factor, t of CO_2/t of Fe
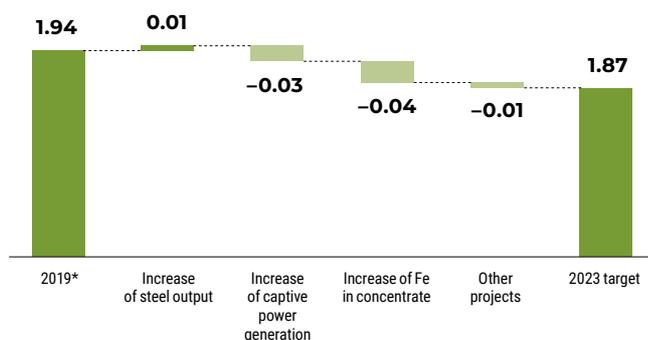
* Specific emissions excluding the transient impacts due to decreased production.

Specific direct emissions of CO_2 per tonne of steel at NLMK Lipetsk in 2022, calculated in line with the guidance[12] for European Union Emissions Trading System (EU ETS), was 1.71 t CO_2 / t of steel. The gap with the EU ETS benchmark[13] — as stricter requirements were imposed in 2021 for the period of 2021–2025 — currently stands at 16%.

NLMK Lipetsk CO_2 emissions according to EU ETS (Scope 1), t of CO_2 / t of steel
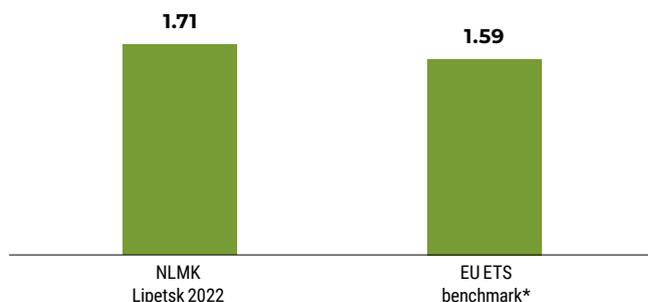
* Assuming unchanged consumption rates for coke and ore materials in 2022.

Climate cooperation

NLMK Group took part in consultations regarding the bill on Greenhouse Gas Emissions,[14] which was adopted in July 2021, and a number of implementing regulations adopted in 2021–2022.

NLMK Group products advance low-carbon economy

In 2022, the Company refined the calculation of output for products that promote consumer-side CO_2 reduction and of emission reduction effects. NLMK Group estimates show that, if the planned volume of such products is successfully sold in 2018–2023, the volume of averted consumer-side emissions will reach the total of about 25 million tonnes per year (on par with the Group's total annual emissions), and about 560 million tonnes throughout the entire product lifecycle (20–50 years).

The energy outputs (heat and electrical energy) supplied by Altai-Koks' Coke and Chemical Plant are also driving lower CO_2 emissions from coal burning in the town of Zarinsk. Company analysis puts the reduction at 0.7 million tonnes CO_2 per year.

Plans for 2023 and the medium term

In 2023, NLMK Group plans to continue developing and executing projects that help reduce CO_2 emissions from existing processes and conducting operational activities that reduce CO_2 emissions. The Group intends to engage with suppliers and clients to share information on carbon footprint reductions and setting of decarbonization targets, to continue carbon footprint assessment for different types of products, to verify its carbon footprint estimation for certain products, and to participate in the CDP programme.

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12 COMMISSION DELEGATED REGULATION (EU) 2019/331 of 19 December 2018 determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council.

13 ETS does not set a separate indicator for BOF steel, but there are established benchmarks for coke, sinter, pig iron, lime and dolomite. The given data per tonne of steel are calculated at the specified consumption coefficients.

14 Federal Law No. 296-FZ "On Limitation of Greenhouse Gas Emissions" dated July 2, 2021.

Reduction of consumer-side CO_2 emissions due to NLMK Group products

Product	Sales, m t	CO_2 emission reduction, CO_2 m t	
		Annual	Product lifecycle
	2018–2023	2018–2023	2018–2023
Plate for wind power	1.0	18.1	361
NGO steel	1.4	6.2	187
GO steel	1.7	0.2	5
Flat steel	1.5	0.1	1
Wear-resistant and high-strength steel (Q&T & Q&P)	0.8	0.4	4
TOTAL	6.4	25.0	559

Assessment of climate risks and their impact on strategy

RISK MANAGEMENT

[**TCFD Risk management a), c)**] Climate risk management is an integral part of NLMK Group's overarching risk management system (see the Operational Control and Risk Management section for more details). Climate risks are identified and assessed by qualitative and quantitative methods, including scenario analysis and modelling of risk materiality, probability, and velocity. Aggregate information about the climate risk profile and related changes is disclosed in the NLMK Group Risk Radar.

For every external driver, the time horizon of potential materialization is assessed. Three time horizons were identified: short-term (up to 2025), mid-term (2025–2030) and long-term (beyond 2030). It is expected that transition risks will be relevant at all time horizons, and most risks will materialize in the long term, since the process transition in steelmaking will become more prominent by the late 2020s. In addition, chronic and acute physical risks will be manifesting more in the long term. The same can be said for the most significant opportunities materializing in the future, since by that time a more significant increase in low-carbon steel production will occur.

In-depth analysis of physical risks at Stoilensky, the Group's main mining asset

The assessment included:
1. Analysis of existing global climate models (CMIP6[15]) and development of an ensemble model.
2. Scenario modelling of anticipated changes in the weather and climate of the Belgorod Region for the years 2020–2040, 2040–2060, and 2080–2100.
3. Identification of Stoilensky's exposure to weather and climate risks.
4. Analysis of historical relevancy and vulnerability of the site's infrastructure to the identified risks.
5. Determination of climate impact thresholds that, if exceeded, will negatively affect the operation of Stoilensky facilities.
6. Assessment of risk materialization probability and infrastructure vulnerability.
7. Recommendations on risk management (including adaptation).

The assessment has determined that the number of days where extreme weather events occur will increase on the medium- and long-term horizons (heatwaves, tropical nights, torrential rainfall and abnormal precipitation, blizzards, abnormally high atmospheric pressure, strong thunderstorms).

However, should the proposed adaptation recommendations be followed, both for the employees and the equipment, the potential damage from materialization of such risks will be negligible or non-existent.

Internal carbon pricing

The Company uses internal carbon pricing in order to support assessment and prioritization of climate projects, forecasting of costs related to the upcoming introduction of CBAM, and management of climate risks. The base for the internal carbon price is the projected allowance price under EU ETS adjusted for the Company's share of exports to Europe.

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15 Coupled Model Intercomparison Project — launched under the World Climate Research Programme in 1995.

ENERGY EFFICIENCY

KEY FIGURES FOR 2022	MATERIAL TOPICS
382.2 PJ (-5.3% yoy) NLMK Group's total energy consumption in 2022 **5.452 Gcal/t (+0.9% yoy)** specific energy intensity of steel production at NLMK Lipetsk	• Energy

KEY EVENTS IN 2022

- Power generation by the CGPP and RCGP at NLMK Lipetsk has reached historical peaks.
- Installation of core and auxiliary equipment continues at the Recovery Co-Generation Plant.
- Gas-powered equipment of the Sintering Plant at NLMK Lipetsk has completed transition to natural gas. Nitrogen compressor KTK-12.5/35 No. 3 at the Oxygen Shop in Lipetsk has been revamped and put into operation.
- A medium-term programme was launched for reliability improvement of the core equipment at Altai-Koks' CGP.
- The Lighting Upgrade Programme at Group sites continued its phased implementation: in 2022, around 50,000 light fixtures were replaced with energy-efficient LED alternatives.
- The Company continues the energy-efficiency project of revamping BF-4 air stoves.

Approach to energy management

NLMK Group continues its systematic efforts to increase the energy efficiency of its production activities, seeking and introducing comprehensive solutions to improve supply reliability and energy efficiency in order to reduce costs and minimize its environmental footprint.

The Company has adopted a group-wide Integrated Management System Policy (IMS Policy). This policy sets forth, among other things, the vision, goals, principles, and management commitments related to the improvement of energy efficiency.

The Group's commitments under the IMS Policy go beyond introducing advanced energy-efficient technologies and solutions that reduce the consumption of energy resources. The Group is additionally committed to developing captive power generation capabilities that utilize metallurgical gases and other secondary energy resources, and to supporting the use of renewable energy where applicable and reasonable. The purchased equipment and services are evaluated in terms of compliance with corporate energy efficiency requirements.

The Unified Technical Policy on Energy Complex Management has been in effect at NLMK Group's Russian companies since 2014. The objective of this policy is to introduce the most advanced technical solutions, machinery, and technologies that bolster the reliability, efficiency, and safety of the Group's energy complex. The policy sets out priorities and rules for applying technical solutions related to the utilization of energy facilities, the implementation of investment programmes for new construction, the re-tooling of core equipment, overhauls of energy assets that belong to NLMK Group companies.

A key performance indicator for improving energy efficiency of production activities is the specific energy intensity of the products (Gcal/t of output). The targets for these key performance indicators are determined in reference to earlier maximum results, taking into account the potential of optimizing the process to the best technologically achievable level, as well as the results of benchmarking of similar machinery against global best practices.

Certification

The Company's energy management system is in compliance with the international ISO 50001 standard, as confirmed by an international certificate. One of the main requirements under this international standard is continuous improvement of energy performance.

The system encompasses all core production sites in the Group:
- NLMK Lipetsk,
- VIZ-Steel,
- Altai-Koks,
- Dolomit,
- NLMK Kaluga,
- NLMK Metalware,
- NLMK Ural,
- Stagdok,
- Stoilensky.

NLMK DanSteel has also been certified to ISO 50001.

In 2022, the Group completed the integration of all existing management systems at its sites into a single Integrated Management System (IMS). All core production sites have implemented integration projects on the enterprise level.

Energy resource consumption in 2022

In 2022 total energy consumption within the Company stood at 382.2 PJ, which is 21.5 PJ lower year-on-year. The reduction was driven by the decrease in output at NLMK USA sites and at NLMK Lipetsk. Non-renewable energy consumption totalled 380.5 PJ. NLMK Group uses a variety of non-renewable fuels in its production activities: coal and coke products account for 57.7% of the total balance, natural gas accounts for 26.4%, and pulverized coal accounts for 15.2%.

On top of that, renewables are used as well, in particular — electrical power from renewable sources. In 2022 the share of renewable power increased from 5.14% to 5.39% of the total electricity consumption. The share of renewable energy in the total volume of electricity consumption is shown without transit flows. NLMK Group did not make any direct purchases from renewable energy suppliers. The share of renewable electric energy in all NLMK Group energy consumption is 0.43%.

Increasing the share of low-carbon energy is one of the priority areas of NLMK Group's efforts aimed at reducing carbon intensity of production and greenhouse gas emissions. This includes nuclear energy. In 2022 the share of power supplied to Group sites by NPPs grew 1.5 times year-on-year and stood at approximately 4.5 billion kWh, or 87% of the total electricity consumption.

Renewable electric energy consumption across NLMK Group [GRI 302-1]

Year	2018	2019	2020	2021	2022
Share of renewable electric energy in purchased energy, %	4.86	5.10	5.14	5.14	5.39
Total share of renewable electric energy in total energy consumed, %	0.37	0.37	0.42	0.44	0.43
Total renewable electric energy consumed, PJ	1.51	1.43	1.68	1.79	1.64

Note: The calculation assumes a conversion factor of 1 MWh = 3.6 GJ.

Share of renewable electric energy in total purchased electricity by region, without transit flows, %

Country	Share of renewable energy[16]	Source	Companies
Russia	2.31	Hydro, wind, solar	NLMK Lipetsk, Stoilensky, Stagdok, Dolomit, NLMK Kaluga, NLMK Ural, NLMK Metalware, VIZ-Steel
USA	19.84	Hydro, wind, solar, biofuel	NLMK Indiana, NLMK Pennsylvania, Sharon Coating
Belgium	21.5	Wind, solar, biofuel	NLMK La Louvière, NLMK Clabecq
France	20.4	Hydro, wind, solar, biofuel	NLMK Strasbourg
Italy	39.0	Hydro, wind, solar, biofuel	NLMK Verona
Denmark	92.1	Wind, solar, biofuel	NLMK DanSteel

Total energy consumption by NLMK Group[17], PJ
[GRI 302-1]
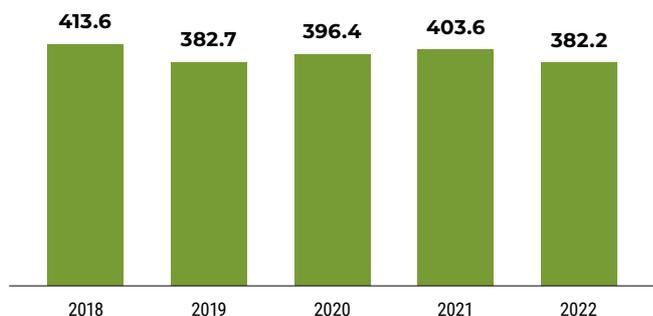
Breakdown of non-renewable fuel consumption by NLMK Group in 2022, % [GRI 302-1]

- Coal and coke products
- Natural gas
- Pulverized coal
- Motor fuel
- Fuel oil
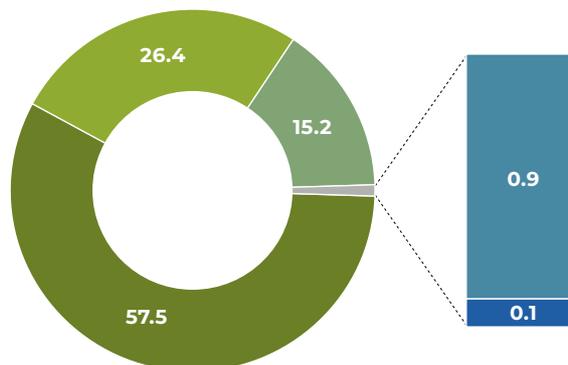
Consumption from non-renewable energy, NLMK Group[18], PJ [GRI 302-1]
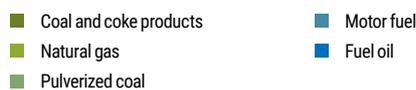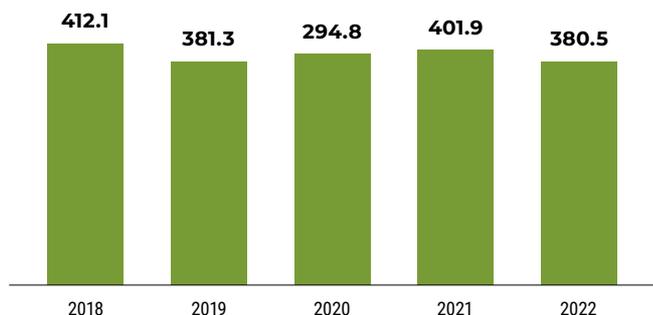
Consumption of non-renewable fuels by NLMK Group, PJ [GRI 302-1]

Fuel type	2018	2019	2020	2021	2022
Coal and coke products	208.64	185.24	197.64	195.70	178.40
Natural gas	87.75	91.26	85.86	91.01	81.79
Pulverized coal	43.30	36.15	43.36	44.13	47.05
Motor fuel (petrol, diesel, liquefied gas)	2.79	2.91	2.90	3.10	2.73
Fuel oil	0.04	0.21	0.29	0.25	0.36
Total	**342.53**	**315.77**	**330.05**	**334.19**	**310.33**

16 The share of renewables in national generation for Russia in 2022 is taken from http://www.finmarket.ru/news/5888978; https://tass.ru/ekonomika/16939991; for Europe from bp Statistical Review of World Energy 2022 | 71st https://www.connaissancedesenergies.org/sites/default/files/pdf-actualites/bp-stats-review-2022-full-report.pdf, pp. 8, 42, 43]. The national share for the US in 2021 is taken from Monthly Energy Review US Energy Information Administration https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf, p. 131].

17 The methodology for calculating the energy consumption by Group companies: purchased energy minus sold energy (sales, shipment, transfer) at each production site. Since 2021, the Company's energy balance includes energy expenditure on production of purchased oxygen; since 2022 — nitrogen and hydrogen, too, as outsourcing supply contracts were signed.

18 Methodology for calculating non-renewable types of energy: total energy consumption minus renewable energy.

Consumption, generation, and sale of electricity and thermal energy by NLMK Group, PJ [GRI 302-1]

Indicator	2018	2019	2020	2021	2022
Electricity and thermal energy purchased for consumption					
Electrical energy obtained	87.30	78.47	77.72	83.45	79.97
Thermal energy obtained as steam	0.50	0.48	0.48	0.51	0.55
Thermal energy obtained as hot water	1.59	1.33	1.03	1.09	1.10
Total	**89.39**	**80.29**	**79.24**	**85.05**	**81.61**
Captive electrical and thermal energy generation					
Electrical power generation	49.36	50.01	49.93	51.34	51.11
Thermal energy as steam	21.90	21.75	22.26	22.00	20.49
Thermal energy as hot water	9.78	7.41	7.68	7.95	7.58
Total	**81.03**	**79.17**	**79.87**	**81.29**	**79.18**
Electricity and thermal energy sold to external consumers					
Electricity sold and transmitted	10.70	8.99	8.63	9.23	11.66
Heat energy sold and transmitted as steam	0.35	0.37	0.40	0.44	0.42
Heat energy sold and transmitted as hot water	2.76	2.35	1.92	1.96	1.99
Total	**13.81**	**11.71**	**10.94**	**11.6**	**14.07**

Specific energy intensity[19] of NLMK Lipetsk, Gcal/t [GRI 302-3]

Indicator	2018	2019	2020	2021	2022
Specific energy intensity	5.469	5.641	5.546	5.402	5.452

The year-on-year increase of specific energy intensity in 2022 was driven mainly by the reduction of steel output and by commissioning of additional equipment.

Captive electricity generation

The Company pursues reduction of costs by implementing investment projects and optimization initiatives aimed at increasing captive generation of electricity and thermal energy.

Electricity is generated at the Company's captive power plants, which are chiefly powered by off-gases from steel production. More than 80% of the electricity generated at NLMK Lipetsk (and used for its production needs only) and 100% of the electricity generated at Altai-Koks is produced using NLMK Group's captive recyclable resources (steelmaking gases).

The maximum possible utilization of the available recyclable energy is one of the main challenges faced by NLMK Group; overcoming this challenge will make it possible to not only minimize expenditure, but also to reduce our environmental impacts by reducing emissions of greenhouse gas emissions and other substances.

In this reporting period, the total installed in-house generation capacity remained unchanged at 733 MW: 522 MW at the Lipetsk site, 200 MW at Altai-Koks; the installed capacity of gas-piston units at NLMK Ural is 11 MW.

Captive electricity generation at NLMK Group sites

Captive electricity generation at NLMK Group sites

NLMK Lipetsk: 522 MW

Co-generation plant: fuel — coke oven gas, blast furnace gas, natural gas
Recovery co-generation plant: fuel — blast furnace gas, natural gas
Top pressure recovery turbine station: no fuel is used; instead, electricity is generated from excess blast furnace gas pressure

Altai-Koks: 200MW

Co-generation plant: fuel — coke oven gas

NLMK Ural: 11MW

Mini gas-piston co-generation plant: fuel — natural gas

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19 Specific energy intensity = (energy consumption during steel production / extraction and processing of raw materials, Gcal) / (steel production / extraction and processing of raw materials, t) The following types of energy resources were used in the calculation: purchased — coking coal and additives, pitch coke, lump coke, coke breeze, pulverized coal, natural gas, fuel oil, thermal energy as hot water, steam, electricity, oxygen (NLMK Lipetsk and NLMK Kaluga), nitrogen and hydrogen (NLMK Lipetsk), and heat from chemically treated water (VIZ-Steel); sold — coke breeze, coke nut, chemical products, blast furnace gas, steam, thermal energy as hot water, oxygen, nitrogen, compressed air, industrial water, and commercial pig iron.

Share of captive electricity in total electricity consumption at NLMK Lipetsk[20] %

58.0 — 2018
65.0 — 2019
63.7 — 2020
63.4 — 2021
66.4 — 2022
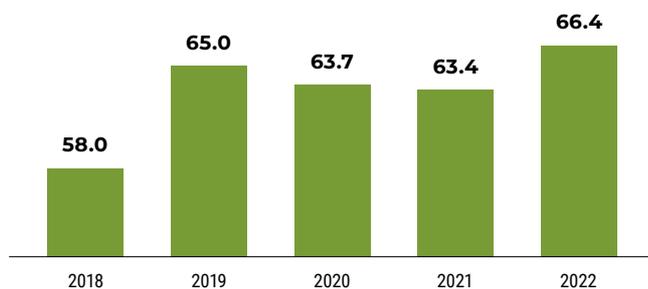
Captive electricity generation at NLMK Lipetsk[21]

450.2 / 84.0% — 2018
478.3 / 82.0% — 2019
480.2 / 72.2% — 2020
489.2 / 77.2% — 2021
486.8 / 80.6% — 2022

■ Captive power generation, MW
■ Share of captive generation from secondary fuel gas
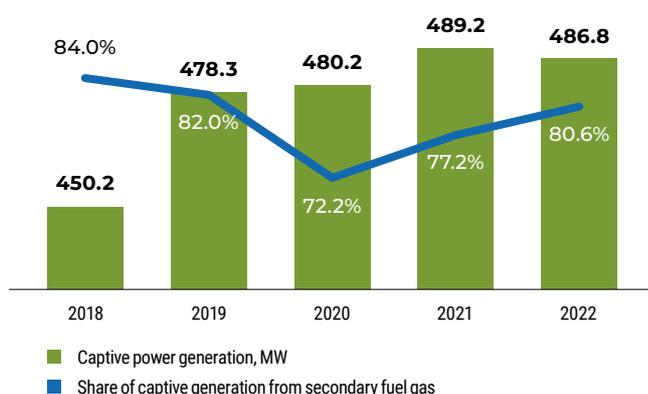
In 2022 the generating capacities of NLMK Lipetsk achieved an all-time high in hourly output: CGP — 349 MW, RCGP — 165 MW).

Ongoing project to build Recovery Co-Generation Plant No. 2

In 2019 NLMK Group launched a project to construct a new recovery co-generation plant at NLMK Lipetsk. The new plant will be fuelled by recyclable gasses from steel production: BOF and BF. This is going to become the first project in Russia to use BOF gas for power generation. The installed capacity of the new recovery co-generation plant will be 300 MW. The total investment in the project is estimated at RUB 40 billion.

In 2022 the site received deliveries of core process equipment, including two turbine generators of 150 MW installed capacity each. Civil construction continued in parallel with the installation of auxiliary equipment at all future plant units.

Plans for 2023 include energizing the equipment of the plant's power distribution system, completing the installation of core equipment, and starting the commissioning procedures.

Optimization initiatives undertaken by NLMK Group in 2022

Over the reporting period, NLMK Group sites have implemented a series of optimization projects aimed at improving the efficiency of fuel gas use, improving the efficiency of compressors, pumps and cooling equipment, optimizing of process maps in energy production, loptimizing the load and layout of energy resource networks, and optimizing energy equipment operation parameters.

In 2022 optimization projects at the generating capacities of the CGP and RCGP at NLMK Lipetsk and CGP at Altai-Koks were aimed at changing the operating modes and control algorithms for boilers and turbines, using new combustion air preheating technology, implementing of cleaning systems at turbine generator capacitors.

The energy-efficiency activities at CGP in Lipetsk enabled the achievement of the maximum hourly consumption rate for blast furnace gas of 1,225 k m³/h. This advances the goal of maximum utilization of secondary steelmaking gases and reduction of natural gas procurement in power generation.

Energy-efficiency optimization projects in 2022 delivered an effect of RUB 1.2 billion.

Replacement of lighting systems at NLMK Lipetsk

In 2022 NLMK Lipetsk replaced 47,000 lighting fixtures as part of the energy-efficiency programme to upgrade office lights. The effects also include the elimination of class 1 hazardous waste generated by obsolete lights. The savings in Lipetsk in 2022 totalled RUB 19.5 million, with full-year effect expected at RUB 48 million.

Moreover, 13 shops at NLMK Lipetsk received 4,900 LED lights as part of the targeted programme to upgrade ceiling lights. Its economic effect at year-end exceeded RUB 5.6 million.

The implementation of the targeted programme continues at other NLMK Group sites as well.

Transition of core steelmaking equipment at the Sinter Plant of NLMK Lipetsk to natural gas

In 2022 the Company completed the project to switch Sinter Plant equipment at NLMK Lipetsk from blast-furnace to natural gas. The unused blast furnace gas is redirected into power generation.

20 The share of captive generation increased year-on-year in 2022 following a reduction in electricity consumption.

21 The share of captive electricity generation from secondary fuel gases went up in 2022 as blast furnace operation parameters were stabilised after the completion of repairs.

Savings through optimization activities

Indicator	2018	2019	2020	2021	2022
Effect from energy-efficiency activities, RUB m	509	1,151	668	1,569	1,229

Reduction in energy consumption[22] as a result of energy-saving initiatives (programmes) at NLMK Lipetsk, 2014–2018 **[GRI 302-4]**

- Total power savings, TJ
- Total fuel savings, TJ
- Total reduction of energy consumption, TJ
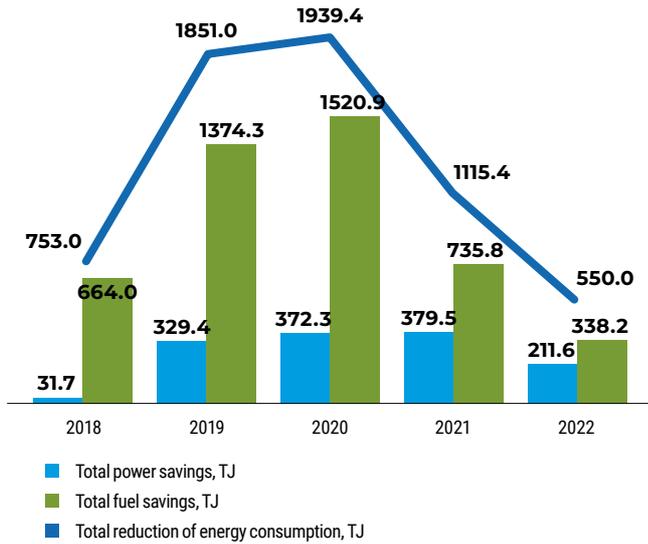
Motor fuel consumption

The Company has determined technically feasible levels of specific fuel consumption for each category of transport and separately for most common vehicle models (motor fuel is covered by the Company's energy management system).

NLMK continuously pursues its goals: motor fuel consumption by rail transport at NLMK Lipetsk was reduced in 2022 by 6% (125,000 litres) and by road transport at Stagdok by 3% (288,000 litres).

In 2023 and going forward, the efforts to cut motor fuel consumption will continue with a focus on process optimization, implementation of Best Available Techniques and improvement of safe driving culture. The total reduction is planned to reach up to 45%.

Consumer-side reduction of energy consumption

[**GRI 302-5**] NLMK produces high-strength and wear-resistant steels. These steels deliver metal structures of lower weight, which, in turn, leads to lower fuel and steel consumption and, ultimately, drives the transition to low-carbon economy. The Company also produces steel plates that are used in construction of wind power installations, as well as premium grain-oriented steels that allow consumers to reduce specific magnetic losses in transformers by 5–15%.

Plans for 2023 and the medium term

Improving the energy efficiency of production is a key goal in the Company's development plans. The main lines of action to boost energy efficiency in 2023 and the medium term include:

- ▶ Reducing specific energy consumption at production units; in the medium term — reaching the minimum technically feasible level of consumption,
- ▶ Optimizing process charts for the production of energy resources,
- ▶ Driving efficiency of various types of equipment (energy, compressors, pumps, lighting),
- ▶ Reducing the amount of purchased thermal energy,
- ▶ Developing and introducing innovative digital energy solutions,
- ▶ Implementing investment projects for infrastructure development, technical upgrades/construction of facilities with improved energy efficiency performance.

The Company is working on a portfolio of technological development projects in the energy sector. The focus areas in 2023 will be the development of projects for application of industrial energy storage technologies and analysis of alternative hydrogen production technologies.

22 Effects of energy-efficiency programmes are evaluated by conversion in terms of equivalent units of purchased energy (natural gas and electricity) used to produce a given energy resource. Project effects are monitored for 12 months; actual savings are annualized vs. a similar baseline period before implementation.

ENVIRONMENTAL PROTECTION

KEY 2022 FIGURES	MATERIAL TOPICS
56% Pollutants discharge into water bodies reduced compared to 2018 baseline	• Air emissions • Water consumption and discharge • Biodiversity • Secondary raw materials and waste

KEY 2022 FIGURES

56%
Pollutants discharge into water bodies reduced compared to 2018 baseline

12%
Specific emission of dust reduced compared to 2018 baseline

97%
of water recycled and reused100% of secondary iron waste recycled

$2.2 billion
allocated to investment projects with an environmental impact since 2000

$317 million
allocated to operational and investment projects with an environmental impact in 2022

29
projects under the Environmental Programme planned through to 2024 have been completed successfully

5,000
trees saved due to recycling of paper and cardboard

MATERIAL TOPICS

- Air emissions
- Water consumption and discharge
- Biodiversity
- Secondary raw materials and waste

KEY EVENTS IN 2022

- NLMK Ural fully eliminated effluent discharge into water bodies.
- NLMK Lipetsk completed a revamp of the dedusting system at Blast Furnace No. 3. The newly achieved effectiveness of dust capture is 99.9%.
- NLMK Kaluga replaced over 1,500 filters in its air treatment systems to ensure residual dust content in line with the EU Best Available Techniques.
- Stoilensky built a large-scale on-site storm sewerage system.
- Altai-Koks implemented steam injection at Coking Battery No. 5 to reduce fugitive emissions.
- Projects under the new Environmental Programme were kicked off, including construction of a waterless cooling system for slag at Blast Furnace Shop No. 2, recycling of water downstream of local treatment facilities to be reused at NLMK Lipetsk, revamp of dedusting facilities at Coke Dry Quenching Plant No. 1.
- Real-time monitoring tools implemented: machine vision, small-sized air monitoring stations deployed along the boundary of the sanitary protection zones of NLMK Lipetsk and Stoilensky, mobile environmental lab introduced at Stoilensky.
- Ecology IT System implemented to automate environmental reporting.
- Corporate regulations adopted for assessment of environmental risks and for monitoring and conservation of biodiversity.

AWARDS AND COMPETITIONS

- NLMK Group received a silver medal from the 28th Metal-Expo in 2022, an international industrial trade fair, for its revamp of the fugitive emission capture system at the BOF Shop and for development of an energy-saving green technology to manufacture briquettes from captured dust.
- Stoilensky won the *Leaders of Russian Business* competition, held by the Russian Union of Industrialists and Entrepreneurs, in the *Environmental Responsibility* category.
- NLMK won the IV national competition *Reliable Partner — Environment* in the *Best Recycling Project* category.
- NLMK Lipetsk received an honorary certificate for its active participation in the *Green Spring 2022*, the VIII Russian national community clean-up. The Company was commended for its proactive position and significant contribution to environmental protection.
- Stoilensky won first place in the regional *ECOcompany Competition* in the *Waste Management* category.

Environmental policy commitments

[GRI 2-24] Environmental stewardship is a top priority for NLMK Group's activities — both on the part of the Board of Directors and the CEO (Chairman of the Management Board) of the Company. The Group's CEO and Board of Directors review its environmental performance on an annual basis. The Strategic Planning Committee under the Board of Directors studies risks related to sustainable development, including those related to the environment, and approves the Environmental Programme, which is updated regularly if new risks are identified, and investments in environmental protection projects.

NLMK takes a comprehensive approach to environmental management by focusing on reducing air emissions, maximum possible reuse and processing of waste, conservation of water resources and biodiversity, and rehabilitation of contaminated land.

Recognizing the right of future generations to enjoy a healthy environment, the Group objectively assesses environmental risks and is committed to minimizing them. It allocates significant resources to various environmental programmes and the implementation of innovative technologies.

For more information on environmental issues, please visit the Company website.

TARGETS FOR 2023 AND KEY PERFORMANCE INDICATORS
As part of its current Environmental Programme, NLMK Group has established the following targets:
- ▶ Reduction of specific atmospheric emissions down to the level of EU Best Available Techniques.
- ▶ Increase of the share of secondary raw materials utilization to 92%, including of iron-containing recyclables up to 101% (taking into account accumulated volumes).
- ▶ Reduction of impacts on water resources — decrease of pollutant discharge into water bodies by 25%.

Reduction of specific emissions, NLMK Group, 2023 target
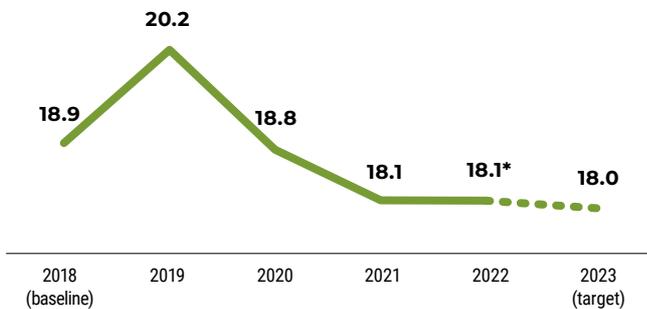
* Calculated indicator that takes into account the reduction in NOx emissions actually achieved by NLMK due to the implementation of a number of measures to improve the fuel efficiency of the diesel locomotive fleet implemented in 2018–2022. The results of this reduction will be taken into account by the regulator at the end of 2023 after the formal procedure is completed. Without taking into account the specified adjustment, the emission is − 18.5 kg/t of steel.

Reduction of specific air emissions by substance, NLMK Lipetsk
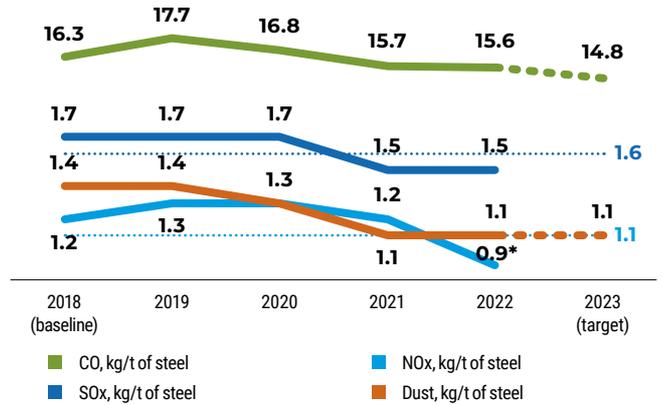
* Calculated indicator that takes into account the reduction in NOx emissions actually achieved by NLMK due to the implementation of a number of measures to improve the fuel efficiency of the diesel locomotive fleet implemented in 2018–2022. The results of this reduction will be taken into account by the regulator at the end of 2023 after the formal procedure is completed. Without taking into account the specified adjustment, the emission is − 1.3 kg/t of steel.

An additional target was set for the Group's Russian companies for specific emissions of class 1 substances. Set at 0.07 g/tonne of steel, the target was achieved in 2021.

Reducing impact on water resources
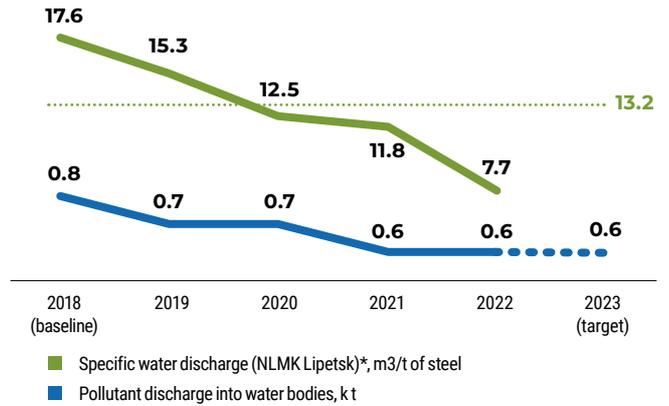
* Industrial and household wastewater, total.

Increasing the recycling rates[23]
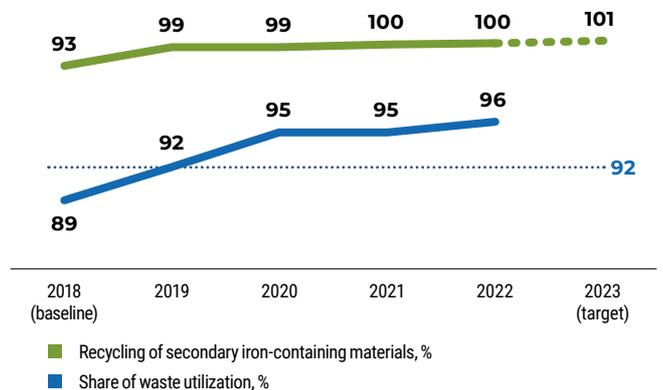
23 Without overburden and tailings; taking into account accumulated sludge.

INVESTMENT IN ENVIRONMENTAL PROTECTION
Each year NLMK Group commits significant resources to ensuring the accident-free operation of equipment and the implementation of investment projects that have an environmental impact. Environmental spending in 2022 was $317 million.

NLMK Group spending on environmental protection, $ m [GRI 103-2]
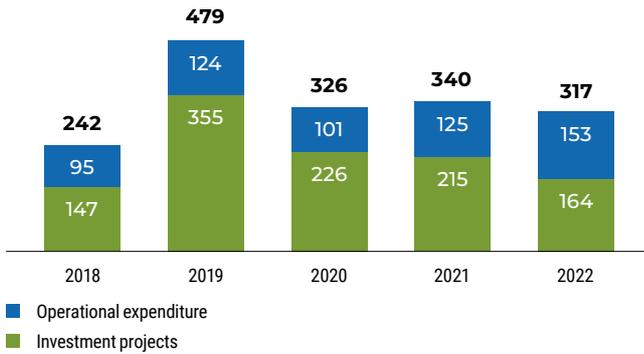
In implementing its environmental programme, NLMK Group focuses on the introduction of the best available techniques (BATs). As part of a four-party agreement between NLMK, the Ministry of Natural Resources, Rosprirodnadzor and the administration of the Lipetsk Region, the Company has already implemented seven out of nine projects planned until 2024. They aim to implement the Ecology Federal Project. The reduction of air emissions due to these projects is 9,900 tonnes, which is 50% more than originally planned in the Federal project.

In 2022, NLMK Lipetsk completed a revamp of the de-dusting system for capturing fugitive emissions in the mixer section of BOF Shop No. 1 and an upgrade of de-dusting at BF-3 casthouse, with the total dust emissions reduction of more than 300 tonnes per year. NLMK Lipetsk also completed a revamp of the collection tank of hot-rolling mill water supply, which eliminates the risk of soil contamination on an area of 400 m².

Total investment in environmental projects since 2000 has exceeded $2.2 billion. Over this period, specific air emission of NLMK Group has gone down from 43.3 kg/tonne of steel to 18.1[24] kg/t of steel. Overall, alongside a two-fold increase in production, the cumulative impact on the environment was reduced by 58% and complies with RF BAT.

Environmental monitoring system

NLMK Group seeks to assess its impacts on the environment and conducts continuous monitoring at its sites and in the cities of operation. In 2022 the Company took over 3.5 million measurements of air quality, water and soil conditions, which amounts to about seven measurements per minute.

For example, it has deployed more than 500 metering stations in Lipetsk: at source, at the sanitary-protection zone (SPZ) boundaries and in the city. The measurements are made by the NLMK Lipetsk own lab, a third-party lab reporting to Rosprirodnadzor, automated monitoring sensors, and stationary detection stations of the Russian Meteorological Service.

AT-SOURCE MONITORING

NLMK Production System tools for environmental monitoring
The Group's flagship site, NLMK Lipetsk, has its main emission sources outfitted with control sensors. Their concentration readings are fed into an IT system, which covers 70% of the site's emissions with real-time monitoring. These data are analysed against control charts. The Environmental Service is tracking the real-time values of dust, hydrogen sulphite, nitrogen concentrations as well as other substances. In case a threshold is exceeded, experts can address the deviations promptly, identify the root causes, and take systemic action to eliminate and prevent them.

One such action, for example, was to replace the reagent in the on-site slag granulation facilities of Blast Furnace No. 6, which reduced the emission of hydrogen sulphide. Starting from 2019, milk of lime had been used to absorb nitrogen sulphide. This resulted in frequent clogging of the equipment and could potentially lead to an unplanned furnace shutdown. Moreover, the lime contaminated the premises of the furnace, precipitated on vehicles and buildings. Expert analysis of alternative absorbers identified sodium carbonate as a viable option that offers better environmental performance: nitrogen sulphide emissions at this source went down several times.

Machine vision in service of the environment
In 2022, NLMK Lipetsk continued the deployment of a machine vision-based system for visible emission analysis. The purpose of the system is to identify any non-typical atmospheric emissions recorded by CCTV cameras, determine their location, estimated volume and send notifications to the plant's specialists for analysis and timely response.

The system enabled in-depth analytics that maps emissions onto shop processes, identifies causes of non-typical events and eliminates them on the production level.

The machine vision pilot run at the Coke and Chemical Plant has provided data to analyse coking battery door wear. This statistical analysis allowed the Company to improve door maintenance. It led to a reduction of gassing from doors by almost 80%. In blast furnace operations, this tool enabled a 5–15% reduction of non-typical emissions at all blast furnaces.

The system currently has 11 cameras, located across coking, sintering and BOF operations. The project is going to be scaled to other sites of the Group.

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24 Calculated indicator that takes into account the reduction in NOx emissions actually achieved by NLMK due to the implementation of a number of measures to improve the fuel efficiency of the diesel locomotive fleet implemented in 2018–2022. The results of this reduction will be taken into account by the regulator at the end of 2023 after the formal procedure is completed. Without taking into account the specified adjustment, the emission is − 18.5 kg/t of steel.

In addition to innovative monitoring systems, NLMK Lipetsk has procured portable gas analysis equipment for mobile and rapid measurements of pollutants in atmospheric air at the Lipetsk site. This will make it possible to control the quality of atmospheric air in places not equipped with stationary equipment.

NLMK Group has started to ensure compliance with the new regulatory requirement to outfit emission sources with automated control equipment.

Stoilensky installs automated emission control system

In 2022 NLMK Group completed the installation of an automated emission control system at main sources of the Pelletizing Plant at Stoilensky. The automated system comprises 20 measurement sensors and a software suite that collects and analyses data in real time. All real-time data are displayed on the monitors of the plant's dispatcher and the site's environmental specialists. The data in the new system allows experts to analyse the effects of induration modes on the emission volumes and introduce adjustments where necessary. This enables timely response to deviations and a reduction on dust and gas emission into the atmosphere. The system ensures monitoring and control over 85% of the site's emissions.

MONITORING ON THE SANITARY PROTECTION ZONE BOUNDARIES AND IN THE CITY

The Company regularly publishes environmental monitoring data on the main controlled substances (carbon monoxide, hydrogen sulphide, sulphur dioxide and nitrogen dioxide) in the air of Lipetsk. It makes available a map that shows the indicators of average monthly values in MPC shares both from the posts of Russia's Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet) and from 12 additional control points on the border of the sanitary protection zone of the plant and in the city.

Low air pollution levels in the city of Lipetsk

Since 2014 the city of Lipetsk, which is home to NLMK Group's largest asset, has been officially recognized as the cleanest steelmaking city in Russia, according to data from Roshydromet. Thanks to environmental protection measures, the Integrated Air Pollution Index (IAPI) in the city of Lipetsk fell by a factor of more than 10 between 2000 and 2022.

Atmospheric air protection

[GRI 305-7] NLMK Group makes considerable efforts to reduce air emissions. Its Strategy 2022 sets a target of reducing specific air emissions from 18.9 kg/t in 2018 to 18.0 kg/t by 2023, or by 5%. At the end of 2022, total specific emission stood at 18.1[25] kg/t of steel.

COMPLETED EMISSION REDUCTION PROJECTS

Dedusting upgrade at the mixer section

A dedusting unit, rated at 600,000 m3 of gas per hour, was built in the mixer section at BOF Shop No. 1 of NLMK Lipetsk, which reduced dust emission in the area by five times.

The mixer section emits dust when hot iron is poured, which is now captured and treated by the dedusting system. It improves the gas treatment performance to 5 mg of dust per m3, in line with best available techniques. The annual emission reduction is over 100 tonnes. The project investment was over RUB 650 million.

New filters at Blast Furnace No. 3

NLMK Lipetsk has completed a revamp of the dedusting system at Blast Furnace No. 3. The newly achieved effectiveness of dust capture is 99.9%. Sustained environmental upgrading has provided all blast furnaces at NLMK Lipetsk with modern dedusting units on par with best available techniques. Reduction of dust emissions is 237 tonnes per year. The entirety of captured dust is recycled into blast-furnace operations as an iron ore input. The project investment amounted to RUB 320 million.

Pollution level	Value
Very high	>14
High	7–13
Elevated	5–6
Low	0–4

25 — 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022

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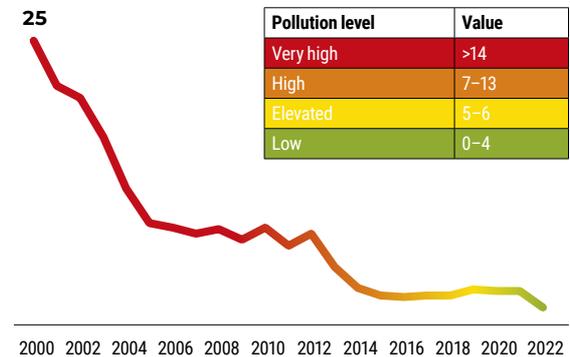
25 Calculated indicator that takes into account the reduction in NOx emissions actually achieved by NLMK due to the implementation of a number of measures to improve the fuel efficiency of the diesel locomotive fleet implemented in 2018–2022. The results of this reduction will be taken into account by the regulator at the end of 2023 following formal procedures. Without taking into account the specified adjustment, the emission is — 18.5 kg/t of steel.

Mobile dust suppression at NLMK Lipetsk operating round the clock

The mobile dust suppression system is a unique unit fitted with a turbine to blast out water droplets. The droplets capture dust particles and reduce the dust content in the air. The unit is also used to treat open bulk storage sites with specialized solution that reduces secondary dusting. These activities have decreased gross dust emission by warehouses by 40 tonnes per year, which is about five dump trucks worth of dust. The unit is available on demand to any shop that plans operations that are prone to dust emission.

Improved efficiency of industrial vacuum cleaners

October 2022 at NLMK Lipetsk was marked by the end of the second season when industrial vacuum cleaners were in operation, procured in 2020 to clean motor roads and site premises. In 2022, the vacuum cleaners collected 2,200 tonnes of dust, which is almost a two-fold increase year-on-year. Higher performance was achieved through optimization activities, switch to round-the-clock operation, etc. The total amount of dust collected over the two seasons in operation is over 3,500 tonnes.

Dedusting upgrade at Stoilensky

In 2022 Stoilensky completed the upgrade of the aspiration system in the medium and fine crushing building of the beneficiation plant. Eight dedusting units were replaced, three upgraded, and four new ones installed. The implementation of the project has significantly reduced the concentration of dust in the air of the working area and halved the gross emission of dust into the atmosphere. Total investment in the project exceeded RUB 600 million.

Innovative solutions to cut emissions at Stoilensky

NLMK Group is developing non-standard and innovative solutions to meet environmental challenges. In 2022, for example, Stoilensky ran pilot tests of ceramic filters at the dedusting units of its Pelletizing Plant. Ceramic filters are made of a completely novel material type that performs much better during autumn and winter compared to conventional systems. The pilot was around a month long and approximately 400 kg of dust was collected. The residual dust concentration that was achieved dropped below 5 mg/m3, which is almost 20x better than the performance of current filters. Overall cleaning performance was 99.9%. The Company is going to continue testing this new technology in 2023.

Reduced dusting at the tailings storage facility

A set of measures was undertaken at Stoilensky in 2022 in order to reduce the impacts of its tailings storage facility. Grass was planted on the dry embankment (approx. 9 ha) and 114 ha of beaches were treated with a binder solution. The second stage of the beach irrigation project completed in 2022, including the installation of water ducts with sprinklers on the pile dam. These activities secured the dust concentration on the SPZ boundary below maximum permissible concentrations.

Reduction of emissions at Coking Batteries of Altai-Koks

One of the no-cost operational improvements was aimed at cutting emissions during coke discharge at Altai-Koks batteries. Opening time of coking chamber doors is now tracked and displayed. This made the process easier to control and adjust, and led to shorter opening times. As a result, the average opening time of coking chamber doors was reduced by 30% bringing atmospheric emission down significantly.

Replacement of filters at NLMK Kaluga

NLMK Kaluga replaced over 1,500 filters in its air treatment systems. Annual replacement of filters maintains the high cleaning performance and ensures high air quality on the premises. The centralized gas treatment system at the EAF Shop of NLMK Kaluga ensures a residual dust concentration of 5 mg/m³, which is several timer better than household vacuums and on par with EU Best Available Techniques. The system captures over 99% of dust from smelting. The dust captured by the filters at NLMK Kaluga is used in pellet production and supplied to consumers for downstream applications. Annual scheduled replacement of bag filters helps maintain comfortable and safe workplace conditions in NLMK Kaluga shops.

EMISSION OF CONTROLLED SUBSTANCES

NLMK Group's gross emission of non-controlled substances in 2022 decreased by 33,800[26] tonnes, or 8.5%, vs. 2018, the baseline year in Strategy 2022. Specific emissions were reduced by 0.827 kg/t of steel.

74% of NLMK Group's emissions consist of carbon monoxide, a low-hazard substance of hazard class IV, which is not regulated as a harmful substance in many countries. It cannot harm human health, since it comes from high pipes, lighter than air, and is dispersed without forming high concentrations in the surface layers of the atmosphere. At the same time, substances of hazard classes I-II account for only 0.2% of the Group's gross emissions.

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26 Calculated indicator that takes into account the reduction in NOx emissions actually achieved by NLMK due to the implementation of a number of measures to improve the fuel efficiency of the diesel locomotive fleet implemented in 2018–2022. The results of this reduction will be taken into account by the regulator at the end of 2023 following formal procedures. Excluding this adjustment, the decrease in gross emissions is 28,300 t (8.5%), specific − 0.4 kg/t of steel.

NLMK Group's emissions by hazard class, %

298,000 t

9
10
7
1
0.2
74
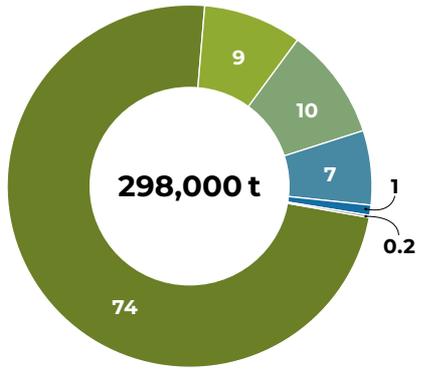
- IV carbon monoxide
- III nitrogen oxides
- III sulphur oxides
- III dust
- III-IV other
- I-II

- I — extreme hazard
- II — high hizard
- III — moderate hazard
- IV — low hazard

NLMK Group emission

18.9   20.2   19.8   18.1   18.1*

332   317   313   314   298*

2018   2019   2020   2021   2022

- Total emission, '000 t
- Specific emission, kg/t
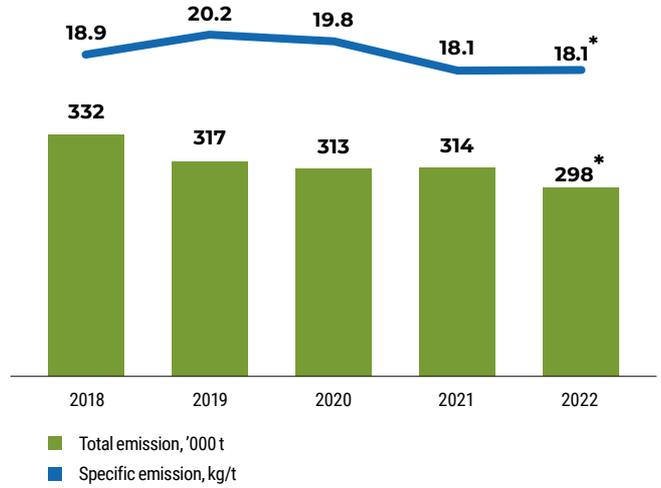
* The emission is shown with adjusted NOx calculation according to the methodology implemented in 2023.

Volume of significant emissions by NLMK Group by controlled substance type** [GRI 305-7]

Indicator	2018	2019	2020	2021	2022
Total, '000 t	331.5	317.0	313.3	314.2	297.7* (303.2)
*per unit of production, kg/t****	*18.9*	*20.2*	*19.8*	*18.1*	*18.1* (18.5)*
NOx, '000 t	27.2	26.2	26.1	26.3	21.0* (26.5)
*per unit of production, kg/t****	*1.6*	*1.7*	*1.7*	*1.5*	*1.3* (1.6)*
SO₂, '000 t	31.7	29.5	31.0	30.6	30.2
*per unit of production, kg/t****	*1.8*	*1.9*	*2.0*	*1.8*	*1.8*
Dust emissions, '000 t	24.4	22.5	23.0	20.7	20.1
*per unit of production, kg/t****	*1.4*	*1.4*	*1.4*	*1.2*	*1.2*
CO emissions, '000 t	244.8	235.3	230.1	233.6	223.0
*per unit of production, kg/t****	*14.0*	*15.0*	*14.5*	*13.4*	*13.6*
Volatile organic compounds, '000 t	2.7	2.8	2.6	2.6	2.9
Hazard class I substances***, t	1.3	1.2	1.2	1.1	1.1
per unit of production, kg/t****	*0.08*	*0.08*	*0.08*	*0.07*	*0.07*
Hazard class II substances***, t	547	514	480	490	596
per unit of production, kg/t****	*0.03*	*0.03*	*0.03*	*0.03*	*0.04*
NLMK Lipetsk					
*CO, per unit of production, kg/t****	*16.3*	*17.7*	*16.8*	*15.7*	*15.6*
*NOx, per unit of production, kg/t****	*1.2*	*1.3*	*1.3*	*1.2*	*0.9* (1.3)*
*SOx, per unit of production, kg/t****	*1.7*	*1.7*	*1.7*	*1.5*	*1.5*

* Calculated indicator that takes into account the reduction in NOx emissions actually achieved by NLMK due to the implementation of a number of measures to improve the fuel efficiency of the diesel locomotive fleet implemented in 2018–2022. The results of this reduction will be taken into account by the regulator at the end of 2023 following formal procedures.

** The Company does not report separately persistent organic pollutants because most of them are not regulated in Russia.

*** Includes information only for the Group's Russian companies, since the emission hazard classes are specified only in the environmental legislation of the Russian Federation, and this information is not collected for the Group's international companies.

**** [GRI 305-7] The Group's specific indicators "Significant specific emissions into the atmosphere by substances per unit of production". These indicators are calculated on the basis of steel production volumes by NLMK Group and the Lipetsk site, respectively, for the corresponding reporting period.

Note: [GRI 305-7] Data on emission of controlled substances are collected at all Group companies where emission is a relevant environmental aspect. Group-level emission indicators are calculated as a sum of individual enterprise emissions as disclosed in statutory reports to supervisory authorities.

PLANNED EMISSION REDUCTION PROJECTS

NLMK Group plans to continue pursuing projects that reduce its impacts on the atmosphere. Among key projects are recycling of off-gases from sintering machines, revamping of dedusting at Coke Dry Quenching Plant, construction of a waterless slag cooling system at Blast Furnace Shop No. 2. The projects aim to reduce emission of dust, carbon monoxide, hydrogen sulphide, nitrogen and sulphur oxides. The expected emission reduction is several dozen thousand tonnes.

Water resources [GRI 303]

NLMK Group seeks to eliminate all impacts on water resources through complete cessation of industrial effluent discharge and through reuse of water resources. A major role in this effort is given to implementation of closed-loop water systems at Group sites.

The Company regularly monitors and assesses risks of water availability; for more details on the identified risks, see the Company official website.

COMPLETED WATER STEWARDSHIP PROJECTS

NLMK Ural fully stops discharge into water bodies

NLMK Ural completely stopped discharge of stormwater and wastewater into the Serga and Revda rivers as well as of industrial effluents from equipment cooling systems. The entirety of water used by the facilities is now treated and reused. Development of the closed-loop water system at NLMK Ural is a priority in NLMK Group Environmental Programme.

High-performance water treatment at NLMK Lipetsk

NLMK Lipetsk has completed a revamp of the collection tank of hot-rolling mill water supply. The revamp will make water treatment more effective and better suited to be used in equipment and hot strip cooling. It allows also to recycle petroleum waste from coking operations. The precipitated sediment is marketed to consumers in the cement industry. The project investment amounted to RUB 100 million.

Stoilensky recycles storm water effluents into production processes

In 2022 Stoilensky built a large-scale on-site storm sewerage system. It captures all effluents from rain or snow melting into collection wells that feed into centralized sewerage where underground pipelines take the water to the tailing dump. It is treated and recycled back into the production process. Stoilensky invested over RUB 120 million into the project.

WATER WITHDRAWAL AND USE

The share of external fresh water intake by NLMK Group in the production water supply is less than 3%. The remaining 97% is recycled water, or more than 3 billion m3, which is comparable to the volume of Lake Ilmen, one of the largest lakes in Europe. On top of avoided withdrawal, this water is reused multiple times after treatment.

Water withdrawal by NLMK Group companies does not exceed 2.5% of the average annual water flow volume [GRI 303-5]. The total mineral content in withdrawn water across all sites is less than 1 g/l. [GRI 303-3]

Fresh water used for production needs by NLMK Group

Line (Specific fresh water use for production needs, m³/t of steel): 2018: 3.4; 2019: 3.8; 2020: 3.6; 2021: 3.3; 2022: 3.3

Bars (Fresh water used for production needs, m m³): 2018: 59; 2019: 60; 2020: 57; 2021: 57; 2022: 54

■ Fresh water used for production needs, m m³
■ Specific fresh water use for production needs, m³/t of steel
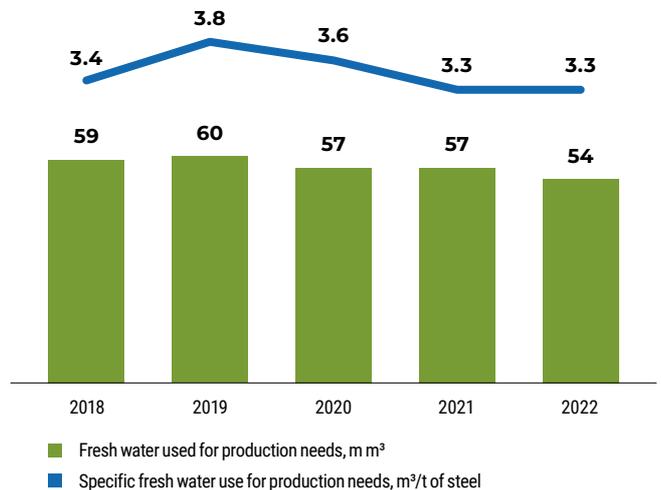
The volume of fresh water use for production needs by NLMK Group companies in 2022 was the lowest over the past 5 years. The activities aimed at prevention of discharge and at water recycling continue to drive the sustained downward trend in fresh water consumption.

Fresh water withdrawal (intake) by NLMK Group, by source and region, and use of withdrawn water, m m³
[GRI 303-3] [GRI 303-5]

Indicator	2018	2019	2020	2021	2022
Water use, total, including	**68.9**	**70.6**	**65.1**	**65.2**	**62.1**
for production needs	58.6	59.8	57.3	57.1	53.8
for household needs	10.3	10.8	7.8	8.1	8.4
Specific water consumption for production needs, m³/t of steel	3.4	3.8	3.6	3.3	3.3
Share of used water, % of water withdrawal (intake)	**49%**	**51%**	**49%**	**48%**	**46%**
Unused water*	72.3	70.3	67.9	71.7	73.5
Fresh water withdrawal (intake) by NLMK Group, including	**139.4**	**139.4**	**131.6**	**135.5**	**134.2**
Russian companies	*104.8*	*103.7*	*98.9*	*101.6*	*102.0*
international companies	*34.7*	*35.8*	*32.7*	*33.8*	*32.1*
Process water	**120.5**	**120.9**	**113.8**	**116.2**	**114.9**
Surface water, including	63.3	64.6	61.5	62.6	58.5
Russian companies	*31.5*	*31.8*	*31.3*	*31.4*	*28.6*
international companies	*31.8*	*32.8*	*30.1*	*31.2*	*29.8*
Groundwater, including	57.1	56.1	52.2	53.5	56.0
Russian companies	*54.8*	*53.8*	*50.2*	*51.5*	*54.3*
international companies	*2.3*	*2.4*	*2.0*	*2.0*	*1.7*
Rainwater collected and stored by the Group, including	0.1	0.1	0.1	0.1	0.4
Russian companies	*0.1*	*0.1*	*0.1*	*0.1*	*0.4*
international companies	*0*	*0*	*0*	*0*	*0*
Potable water	**19.0**	**18.6**	**17.8**	**19.2**	**19.3**
Surface water	0	0	0	0	0
Groundwater, including	17.9	17.6	17.0	18.3	18.5
Russian companies	*17.6*	*17.3*	*16.9*	*18.0*	*18.2*
international companies	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*
Municipal water, including	1.0	0.9	0.8	0.8	0.7
Russian companies	*0.9*	*0.7*	*0.6*	*0.6*	*0.5*
international companies	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
Urban wastewater converted for treatment	1.7	1.5	1.4	1.4	1.4
Consumptive water use**	44.2	47.9	45.6	45.0	46.4
Specific consumptive water use, m³/t of steel	2.5	3.1	2.9	2.6	2.8
Recycled water supply	**3265.1**	**3312.4**	**3186.0**	**3454.8**	**3291.1**
Recycled water in the total water consumption, %	**97.1 %**	**97.1 %**	**97.2 %**	**97.4 %**	**97.3 %**

* Unused water is the water returned with an unchanged composition compared to intake: drainage water from the mines that is discharged without being used in the production process, as well as direct-flow water used for non-contact cooling of production units, lost water and third-party water. This water is not consumed in the production process and is not polluted.

** The difference between water intake, water returned without use, and water discharge off-site. The indicator calculation has been revised vs. the 2021 report: the new calculation excludes drainage water from Stoilensky pit moved to the tailings pond without prior use as it is returned unchanged into the natural water cycle

Fresh water withdrawal by the Group's flagship site NLMK Lipetsk from the Voronezh River has been reduced by an order of magnitude since 1980, from 189.3 to 19.5 m m³.

Fresh water withdrawal from the Voronezh River, NLMK Lipetsk
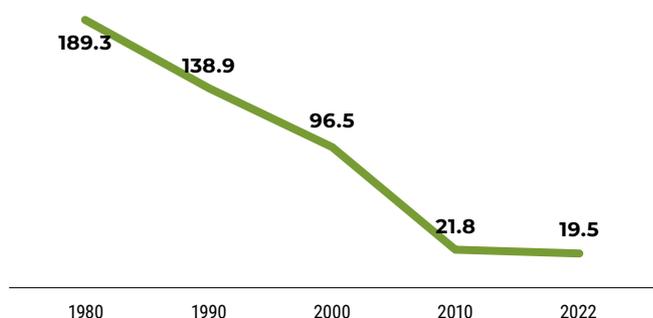
PRIORITY FOCUS ON WATER REUSE AND RECYCLING
In order to reduce their negative impact on water resources, the majority of NLMK Group 's companies are equipped with water recycling systems, which also mitigates the Group's water-related risks.

Share of recycled water in NLMK Group's total water consumption, %
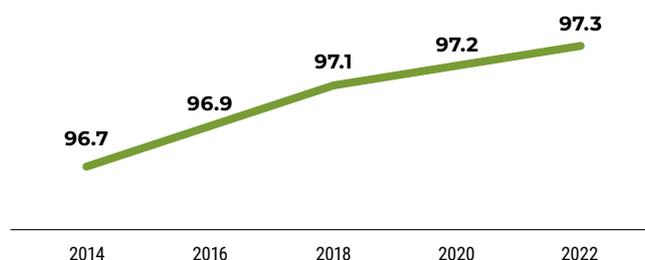
Closed water-loop systems have been put in place at 14 NLMK Group sites. These solutions include both local systems for individual facilities and entirely self-contained subsidiary-wide systems. This helps to reduce water withdrawal and effluent discharge into surface water bodies. The share of recycled water supply at NLMK Group remains at a consistently high level.

Volume of recycled water at NLMK Group companies, m m³

2018	2019	2020	2021	2022
3,265	3,312	3,186	3,455	3,291
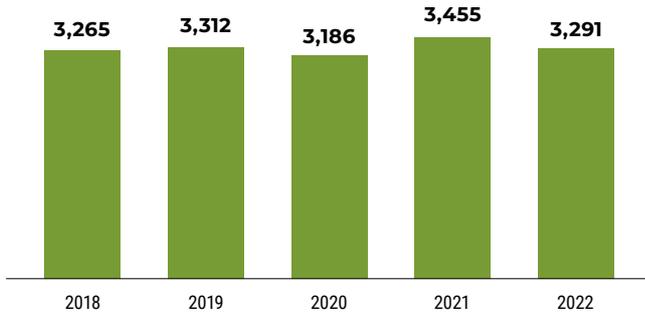
Over the last five years, actions aimed at reducing waste, remedying leaks and advancing the Green Office Programme, which promotes water stewardship practices, have brought down the consumption of potable water by 19%.

Potable and household water consumption, m m³

2018	2019	2020	2021	2022
10.3	10.8	7.8	8.1	8.4
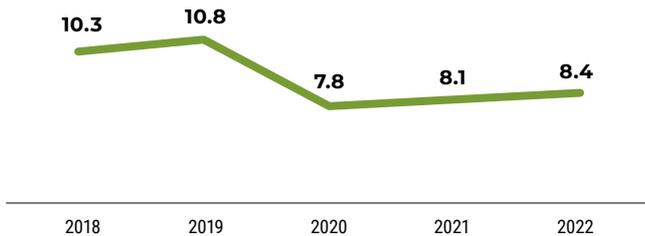
WATER DISCHARGE

The Group's companies are focused on reducing the volume and improving the quality of wastewater generated.

The Company's Environmental Programme sets the goal of reducing the discharge of pollutants with wastewater into water bodies by 25% compared to 2018. In 2022, compared to 2018, the pollutants discharge was reduced by 56% due to the upgrade of local treatment facilities at NLMK Lipetsk, completed in 2020, and a set of measures to reduce effluents. This result is already significantly above the original target. Going forward, NLMK Group seeks to bring industrial effluent discharge by its Russian companies to zero.

Each Group company makes use of water purification and treatment technologies that ensure that the quality of effluents as well as water used for industrial and household purposes meets the standards set by applicable regulations. All discharged effluents have mineral content of less than 1 g/l[27] **[GRI 303-4]**. The trend of the total mineral content in effluents shows an improvement in the quality of wastewater. From 2018 to 2022, total mineral content decreased two-fold.

Measurements are regularly taken in accordance with permits by accredited laboratories at all discharge points. The water level in NLMK's settling ponds and the tailing pond of Stoilensky is also monitored to eliminate the possibility of spills and unauthorized water discharges. There have been no cases of water level approaching critical levels in 2022.

The Group's international companies mainly discharge water that is used for cooling equipment in once-through systems. This water does not get polluted in use and is returned into water bodies in the same conditions as it was withdrawn, without disrupting the natural state of the environment.

Compliance with water discharge regulations is subject to regular monitoring by supervisory bodies as well as the Company's internal environmental service. **[GRI 303-2]**

The flagship Lipetsk site has not made direct industrial effluent discharges into the Voronezh River since 2009. Furthermore, it pursues sustained efforts to reduce discharge of household effluents as well. At the end of 2022, compared to 2018, the volume of effluent discharge reduced by 8 million m3 (31%) and the flow of pollutants into the water body was reduced by 10,000 tonnes (-56%).

The methodology for calculating pollutants discharge into water bodies is disclosed in the Annexes to the Report.

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27 Effluent mineralization is calculated as the ratio of pollutants' mass to effluent volume.

Total volume of water discharge by type, quality, and receiving water body, m m³ [GRI 303-4]

Indicator	2018	2019	2020	2021	2022
Total used water discharge by NLMK Group*, including	26.3	24.1	20.7	20.8	18.2
NLMK Lipetsk, household effluents	8.6	7.3	6.7	6.0	6.2
Stoilensky	7.6	6.5	4.9	6.4	3.0
Other Russian companies	1.8	1.5	1.4	1.4	1.1
International companies	8.3	8.8	7.7	7.1	7.9
Specific water discharge* after use, m3 / t of steel	1.5	1.5	1.3	1.2	1.1
Total water discharge, NLMK Group**	**50.5**	**49.1**	**43.4**	**46.0**	**41.6**
to surface water (rivers, lakes, reservoirs and canals)	46.9	45.7	41.6	44.1	40.0
including to seawater	*0.3*	*0.3*	*0.3*	*0.3*	*0.7*
Converted to third parties for treatment	2.1	2.0	1.8	1.8	1.6
Specific total water discharge**, m³ / t steel	2.9	3.1	2.7	2.6	2.5
Water discharge as % of total water supply	1	1	1	1	1
Share of unused water*** in the total volume of water discharge, %	48	51	52	55	56
Pollutants discharge into water bodies with effluents****, '000 t	17.6	15.3	12.5	11.8	7.7
Effluent mineralization*****, g/l	0.36	0.32	0.29	0.26	0.18

* Industrial and household effluents.

** Including unused water (direct flow cooling water, third-party effluents, rainwater and drainage water). Water discharge volume does not include water collected and converted to third-party organizations / municipalities and the loss of withdrawn water during transportation. In 2022, the volume of such unused water totalled 9 m m³. Data for 2018 and 2019 were corrected relative to the Annual Report 2021 due to the adjustment of indicators.

*** Drainage water, rainwater, non-contact cooling, third-party effluents.

**** The sum of dissolved solids is equal to pollutants discharged into water bodies with wastewater according to the methodology of the Group.

***** Calculated as the ratio of pollutants' mass to effluent volume.

Wastewater after use, '000 t

- ■ Wastewater after use, NLMK Group, m m³
- ■ Specific water discharge after use, m³ / t of steel

Pollutants discharge into water bodies with effluents, '000 t [GRI 303-4]

- ■ NLMK Group
- ■ NLMK Lipetsk
- ■ NLMK Group target
- ■ NLMK Lipetsk target

PLANNED WATER STEWARDSHIP PROJECTS

The Company has already achieved the Strategy 2022 goals to reduce its impacts on water bodies.

Complete elimination of effluent discharge at NLMK Group's Russian companies

Stoilensky is developing a project to eliminate industrial effluents. This is possible with the separation of drainage water flows pumped up from the mine, whereby clean water is isolated and fed directly into the Chufichka River near the site. This will make the river cleaner and improve its depth. Plans for 2023 include the development of project documentation and implementation kick-off.

VIZ-Steel is designing an evaporator plant to remove salts from water, which should reduce the concentration of dissolved and suspended matter in the recycling loop. In concert with operational improvements in rainwater utilization, this will eliminate discharge of water into the Iset River. Treated water will be reused.

Recycling programme

As a vertically integrated steelmaking company, NLMK faces two types of waste generation: mining waste as well as waste from metal production. Mining waste accounts for 98% of the Group's total waste generation and has a negligible impact on the environment being a non-harmful inert material. Overall, 99.9 % of waste generated by NLMK Group's Russian companies in 2022 was non-hazardous. [GRI 306-2] [306-3] [306-4]. Furthermore, 99% of the Company's waste and recyclables is recycled back into production, which prevents environmental impacts.

Additionally, ferrous metal products that have lost their functional properties (scrap) are a valuable raw material that can be reused in steelmaking. This puts NLMK Group's

operations into the loop of the circular economy: 100% of its products can be recycled or reprocessed, more than 30% of the Group's steel output (32.3% in 2022) is already made with ferrous metal scrap (recyclable input). [GRI 306-4}

NLMK Group operates its own scrap collection and processing facilities that advance the circular economy vision. NLMK Vtorchermet is the most technologically advanced scrap processing company in the industry. It covers 85% of demand for quality scrap from NLMK Ural, NLMK Kaluga and NLMK Lipetsk. Vtorchermet annually processes 5 million tonnes of scrap metal.

COMPLETED PROJECTS IN SOIL PROTECTION AND RECYCLING

Recycling of reinforced concrete

In 2021 the Company started a project for the processing of concrete and reinforced concrete debris, which is an example of the utilization of secondary resources in production and an increase in the sales of by-products. NLMK Lipetsk commissioned an installation for processing of crushed concrete, reinforced concrete and bricks that are left after repairs and revamps. These materials used to be removed from the site for disposal. The new installation, rated at over 100,000 tonnes per year, can process the entire volume of such secondary materials generated by the site. It also has a magnetic device to recover metal from the debris. Recycled concrete contains about 5% of metal that is fed back into production. Concrete and brick debris is crushed into rock of various sizes. Crushed rock is in high demand by construction companies, which makes this project effective both in terms of environmental protection and economic gain. As of the end of 2022, the installation has recycled 50,000 tonnes of material. This concrete recycling project won the *Reliable Partner — Environment* national competition in the Best Recycling Project category.

NLMK Lipetsk launches recycling of used sand

In 2022 NLMK Lipetsk launched an installation to reprocess sand from casting moulds. The new facility will recycle back into production up to 70%, or 20,000 tonnes, of sand, which used to be landfilled. Now, used sand moulds are crushed, the material is ground, stripped of binder and turned back into sand. It is mixed with binder again and reused for new moulds.

In 2022 the facility recycled approximately 15,000 tonnes of used sand. Avoided costs of disposal and procurement of sand totalled RUB 39 million. Going forward, NLMK plans to recycle and reuse the entirety of its natural mineral inputs. The project investment was over RUB 140 million.

NLMK launches a market-place for recyclables

In 2022 NLMK Group facilitated the first transactions on Vtorion, an e-commerce platform for the scrap collection and processing industry (https://vtorion.ru/). One of a kind in Russia, this digital platform provides matchmaking for market participants and ensures maximum efficiency and transparency.

The marketplace allows all participants to save on operational expenditures and lets suppliers access their largest customers — steel-making companies — directly and expand their market.

Vtorion offers a flexible set of tools tuned to the specifics of scrap collection activities such as filters based on the material parameters and geography, search for best deals based on the volumes and regularity of supplies, e-auctions in the partner's personal account, automatic qualification of suppliers, and streamlined electronic document flow.

The platform hosts a number of large customers such as NLMK Group's scrap collection network — NLMK Vtorchermet.

INDICATORS IN WASTE HANDLING AND RECYCLING

NLMK Group's waste-handling operations are orientated towards key modern steelmaking trends: minimizing waste generation and increasing the proportion of waste that is processed, reused, and safely disposed of. The goal of Strategy 2022 — to increase waste utilization and recycling at NLMK Group to 92%[28] — has been achieved.

Even today, the vast majority of secondary resources is processed within the Group's facilities. [GRI 306-2] The remaining volumes are transferred to third parties that have appropriate licenses (permits). By optimizing the process of secondary raw materials processing, the volume of waste disposal from NLMK Lipetsk has been reduced significantly from 237,000 tonnes to 107,000 tonnes, meaning that on-site processing went up 130,000 tonnes. By creating a competitive environment between final processors and consumers of secondary raw materials, as well as by optimizing logistics processes, the cost of third-party disposal in 2022 was reduced by 10% compared to 2021.

The volume of waste generation in 2022 went down 0.3 million tonnes. [GRI 306-3]

Recycling of iron-containing materials in 2022 exceeded 100% thanks to processing of iron-containing sludge (mixture of water and dust). The process is carried out by the Briquetting and Slag Processing Plant built at NLMK Ural in 2019. The share of processed sludge increased from 47% in 2018 to 100% in 2022. The total share of recycling, excluding processing of previously accumulated raw materials, amounted to 99.0%, or taking into account the accumulated waste, to 120.0 %. [GRI 306-1] [GRI 306-2]

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28   Not including mining waste — overburden and beneficiation tailings — which is not considered waste in many geographies.
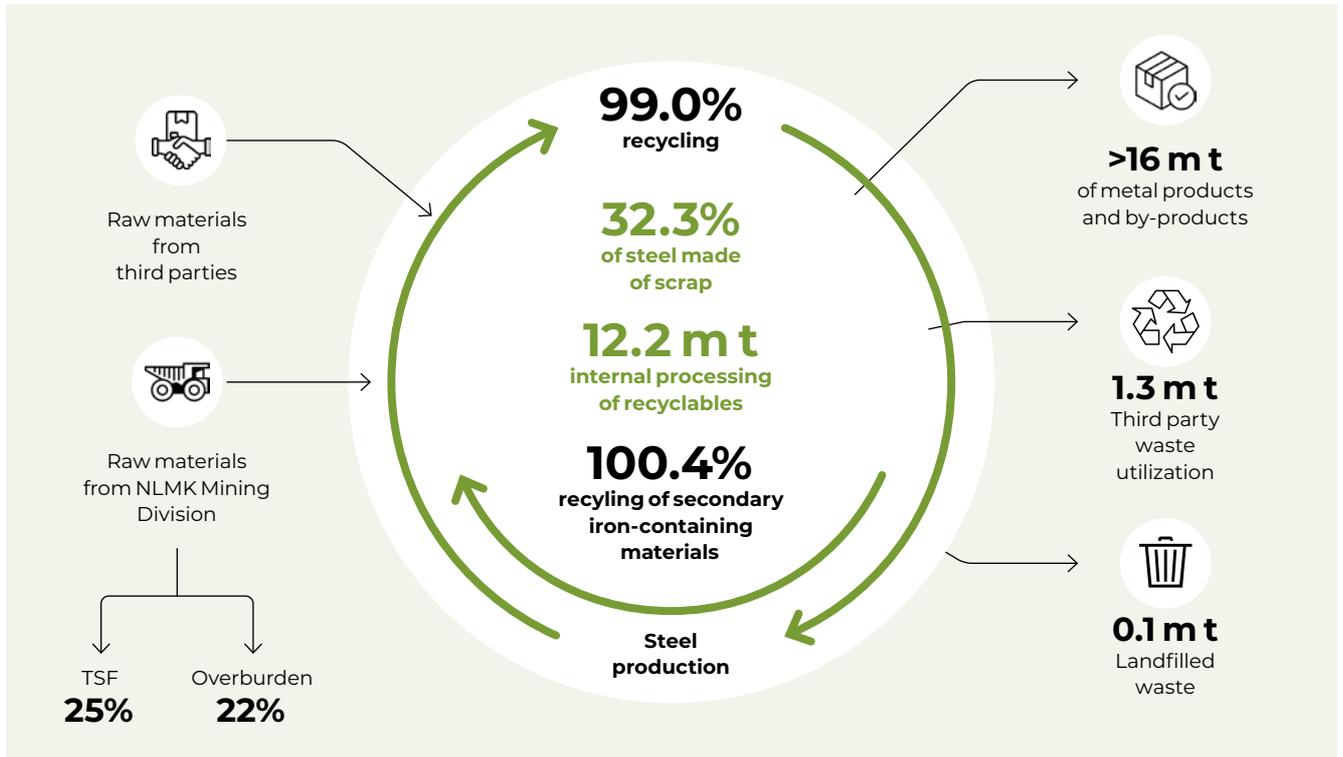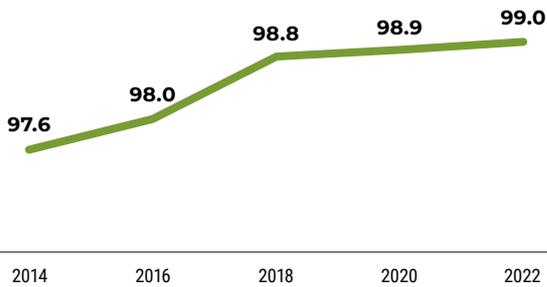
99.0%
recycling

32.3%
of steel made
of scrap

12.2 m t
internal processing
of recyclables

100.4%
recyling of secondary
iron-containing
materials

Steel
production

Raw materials
from
third parties

Raw materials
from NLMK Mining
Division

TSF
25%

Overburden
22%

>16 m t
of metal products
and by-products

1.3 m t
Third party
waste
utilization

0.1 m t
Landfilled
waste

Recycling, %

97.6 — 98.0 — 98.8 — 98.9 — 99.0

2014   2016   2018   2020   2022

Recycling of secondary iron-containing raw materials, %

93.3 — 98.8 — 99.5 — 99.6 — 100.4

2014   2016   2018   2020   2022
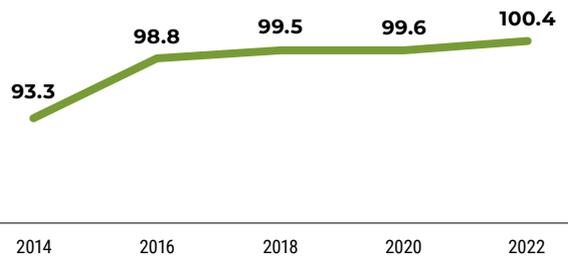
Total waste generated and utilized by NLMK Group (downstream), m t
[GRI 306-2] [GRI 306-3] [GRI 306-4] [GRI 306-5]

Indicator	2018	2019	2020	2021	2022
Waste generation*	**1.5**	**1.5**	**1.4**	**1.6**	**1.3**
hazardous **	0.1	0.1	0.1	0.1	0.0
non-hazardous	1.5	1.4	1.3	1.5	1.2
Secondary inputs recycled in-house	**1.8**	**1.9**	**2.0**	**1.3**	**0.2**
hazardous **	0.0	0.1	0.1	0.0	0.1
non-hazardous	1.8	1.8	1.9	1.3	0.1
Waste and secondary inputs recycled in-house, total	**3.4**	**3.4**	**3.4**	**2.8**	**1.5**
hazardous **	0.1	0.1	0.1	0.1	0.1
non-hazardous	3.2	3.2	3.2	2.7	1.4
Secondary raw materials recovered by third parties	**1.2**	**1.2**	**1.2**	**1.4**	**1.3**
hazardous **	0.1	0.1	0.1	0.1	0.0
non-hazardous	1.1	1.2	1.2	1.3	1.3
Waste disposal at third-party landfills	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
hazardous **	0.0	0.0	0.0	0.0	0.0
non-hazardous	0.1	0.1	0.1	0.1	0.1
Waste incineration (in-house + third parties)	0	0	0	0	0
Secondary raw materials accumulated at year-end	5.9	6.1	6.1	1.6	1.5
Waste disposal, Russian hazard classes 1-4, %	89	90	95	95	95
Recycling of secondary iron-containing raw materials***, %	93.3	98.8	99.5	99.6	100.4
Recycling, total****, %	97.6	98.0	98.8	98.9	99.0

* Excluding secondary raw materials recovered in-house and Stoilensky's overburden and beneficiation tailings.

** "Hazardous waste" includes I-III hazard class waste.

*** When calculating the recycling index, data on the total generation and utilization of iron-containing waste and associated products is used. Mining waste is not factored in. In addition to iron-containing waste, the recycling index takes into account slags, slurries, gas cleaning dust, and ferrous metal scrap, which, in accordance with the process and national legislation, are not waste and are marketed or used for the company needs.

**** Recycling includes waste disposal and by-product recovery, excluding processing of accumulated raw materials.

Overburden and beneficiation tailings generated and utilized by NLMK Group (upstream), m t
[GRI 306-3] [GRI 306-4] [GRI 306-5]

Indicator	2018	2019	2020	2021	2022
Generation of overburden and beneficiation tailings at Stoilensky	46.6	53.7	61.4	64.6	72.5
Share of utilized Stoilensky overburden and beneficiation tailings, %	*10*	*10*	*8*	*8*	*8*
Generation of overburden at Stoilensky, Stagdok and Dolomit*	39.8	51.3	60.5	60.7	67.6
Share of utilized overburden, %	*26*	*29*	*29*	*28*	*22*
Generated beneficiation tailings	19.5	20.5	21.4	23.9	24.1
Utilized beneficiation tailings	4.8	5.3	5.1	5.5	6.0
Utilized beneficiation tailings, %	*24.7*	*25.8*	*23.9*	*22.9*	*24.7*

* The total volume of generated overburden by NLMK Group. For Stagdok and Dolomit, overburden is not waste and is utilized for backfilling post-mining areas, as the mine is developed sidewards, in contrast to Stoilensky, where the mine is being developed primarily "into the depths", and the resulting overburden is mostly considered waste by Russian law, even though it is a non-hazardous inert material.

Upstream
Iron ore production by NLMK Group

Recycling ← Stoilensky → Stagdok, Dolomit

24.1 m t   48.5 m t   8.2* m t

Beneficiation tailings   Overburden (pile)

Upstream waste**: 72.5 m t

Overburden (recycling)

Downstream
Production of steel products by NLMK Group

Recycling ← 0.2 млн т ← Waste generation from steel products

Downstream waste: 1.5 m t

Beyond NLMK Group

1.3 m t   0.1 m t

Third-party recycling (utilization) of secondary materials, incl. the Green Office project   Disposal at third-party landfills
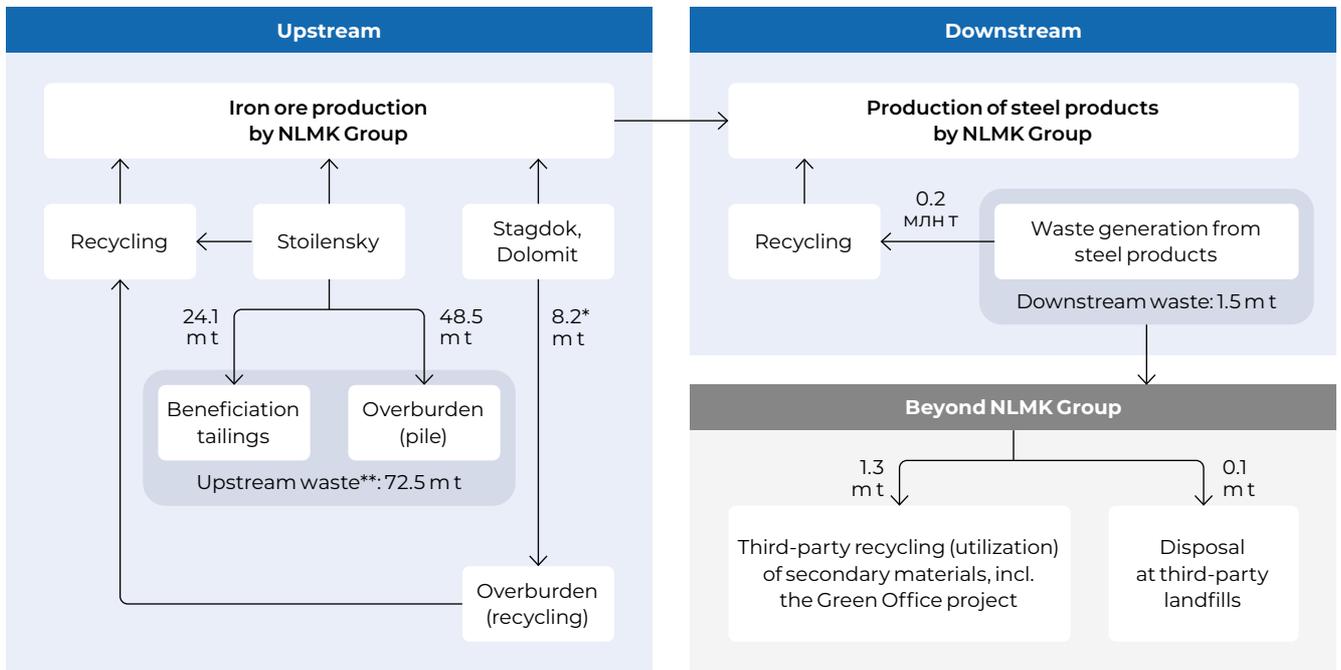
* For Stagdok and Dolomit, overburden is not waste and is utilized for backfilling post-mining areas, as the mine is developed sidewards, in contrast to Stoilensky, where the mine is being developed primarily "into the depths", and the resulting overburden is mostly considered waste by Russian law, even though it is a non-hazardous inert material.

** Many geographies do not classify beneficiation tailings and overburden as waste since they are non-harmful inert materials.

PLANNED PROJECTS IN SOIL PROTECTION AND RECYCLING

New strategy for secondary resource management

In 2022 NLMK Group developed a programme for secondary resource management. It features more than 40 different projects and will allow NLMK Group to achieve one of the strategic Sustainable Development Goals "Ensure sustainable consumption and production patterns" (SDG 12). The main goal of the programme is to drive in-house processing of secondary materials at NLMK Lipetsk up from 87% to at least 99%. [GRI 306-3] The main effects for the Group are achieved through the extraction of additional iron, the rational use of secondary energy resources, as well as the sales of products generated from sorting and separate collection of secondary materials. The Recycling Programme includes not only projects to utilize iron waste in production, but also projects for the recycling of carbon waste (plastic, wood waste, paper) and other technogenic raw materials.

Manufacture of biocoal from NLMK's waste wood

Annual generation of waste wood by NLMK ranges from 4,000 to 7,000 tonnes (tree branches and stumps, wooden containers, defective pallets, etc.). Since these materials are not usable on site and not marketable, the entire unclaimed volume of this waste wood is usually disposed of.

At the end of 2022, the Company began working on a project to start converting waste wood into charcoal. The goal of the project is to enable 100% conversion of waste wood into charcoal to be used as fuel in NLMK's production operations.

Fostering eco-friendly culture

TRAINING [GRI 2-24]

NLMK devotes special attention to fostering a culture of environmental awareness among its employees and local communities in the regions where it operates. The Group developed a series of educational courses for the benefit of the entire staff. In particular, in 2022, the Green City course was developed, aimed at improving the environmental awareness. At least 10% or 5,000 of employees take environmental training sessions and development courses every year.

GREEN OFFICE

NLMK Group has been running the *Green Office* programme for several years already. It aims to enhance the commitment of the Group's employees to eco-friendly culture. In 2022, the Group companies installed additional containers for the separate collection of waste: paper, cardboard, glass, plastic; there are also collection points for used office equipment. At the Lipetsk site alone, 218 tonnes of paper and cardboard were collected and sent for recycling, which is equivalent to 3,700 preserved trees. By the end of 2022, in office premises only the Group has installed more than 350 containers for separate collection of recyclables. All collected recyclables are treated by external specialized organizations.

As part of the development of a responsible consumption and eco-friendly culture, a series of events for the separate collection of recyclables took place in 2022. In a series of videos, the Company executives talk about the most common mistakes in waste sorting. In addition, NLMK's Moscow office switched to separate waste collection.

Green Office is not only a project for separate waste collection; it is also a tool for developing employees' conscious attitude to their health. Thus, in 2022, as part of the project, 12 new bike parking racks were installed at NLMK Lipetsk.

NLMK has installed eco-friendly bins made of recycled plastic

Eco-friendly bins made of recycled plastic were installed at the Lipetsk site's corporate transport stops. As part of the pilot, NLMK handed over more than 300 kg of plastic waste — containers and packaging — that was converted into eco-friendly and durable garbage bins.

Ecosystem development

NLMK Group conducts operations on industrial lands and residential areas in line with applicable law. With a view to preserve biodiversity, the Group strictly prohibits to destroy or damage greenery, build fires, hunt, and fish on the premises of its companies. These requirements are the same for both the Group staff and employees of contracting organizations. All water withdrawal inlets are equipped with fish protection devices. The sites' location does not prevent the movement of migratory birds or animals. According to the Group's assessment[29], its operations have no direct significant impact on biodiversity. [GRI 304-2]

NLMK Group regularly participates in biodiversity conservation projects. Respective measures are in place at all Russian sites of NLMK Group. They include research work, cooperation with nature reserves, replenishment of rare bird populations, release of juvenile fish into rivers and reservoirs, land reclamation, planting of trees and shrubs, and maintenance of forest plantations. The Group's total investment in biodiversity conservation in 2022 amounted to RUB 102.4 million.

NLMK Group's Environmental Programme already includes targets and metrics with a direct or indirect impact on biodiversity:

▶ NLMK Group's CO_2 emission reduction programme (reducing specific emissions, t/t of steel),
▶ Reducing the impact of individual substances (CO, NO_x, SO_x, dust, Class I and II substances, kg/t of steel),
▶ Reducing the impact on water resources (specific water discharge, m^3/t of steel),
▶ Reducing pollutant discharge into water bodies ('000 t),
▶ Increasing utilization of overburden, tailings, and iron-containing wastes (share of overburden and tailings, utilization, recycling of secondary iron-containing raw materials, %).

COOPERATION WITH STAKEHOLDERS

Swan Lake Environmental Park: a natural indicator of NLMK's commitment to a clean environment and biodiversity

Swan Lake Environmental Park is the only bioindicator in Russia and the former Soviet Union that is situated on the territory of an industrial site. The environmental park occupies more than 5 hectares of land situated between the BOF shops of the Lipetsk site. The lake is filled with process water from the site that has undergone treatment following its use in production. The park is inhabited by 650 birds of 52 species, including nine species from the Russian Red Book and the Lipetsk Region Red Book. Every year up to 200 waterfowl from the urban surroundings flock here in winter.

In 2022, populations in the park were replenished, bringing in 56 additional specimens from the Penza Zoo and the Malinki Bird Park in the Rostov region. Moreover, birds brought to the park in 2021 gave birth to almost 100 chicks at the Swan Lake.

Cooperation continues with the Oka Nature Reserve nursery of rare crane species under the Eurasian Cranes Conservation Programme. Experts studied the cranes at the park and entered them into the Russian register of cranes.

Stoilensky continues research and monitoring of biodiversity jointly with Belogorye Nature Reserve

In relative proximity to the production site of Stoilensky lies Yamskaya Steppe, part of the Belogorye Nature Reserve. Since 2020 NLMK has been carrying out biodiversity activities and monitoring based on contracts with the reserve. In 2021, the two parties continued joint research work and environmental monitoring of the impact of Stoilensky's industrial operations on biodiversity, including the inventory of biological diversity, assessing the condition of rare and endangered species of plants and animals, validating the monitoring methods and air quality and surface water evaluation.

NLMK Group companies offset fish stocks

Every year NLMK together with specialized organizations release juvenile fish into water bodies in order to replenish fish stocks.

In 2022, the Altai-Koks environmental team released over 11,000 juvenile carp into the Ob River, and the NLMK Ural environmental team — 4,000 juvenile carp into the Volchikhin Reservoir.

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29   See details in the Group's Annual Report for 2021.

NLMK Lipetsk renews planted greenery

In 2022, as part of a 5-year programme for the replenishment of the site's greenery, more than 1,500 new trees and 6,700 shrubs were planted on the industrial site and along the internal roads, 25,000 square meters of lawns and flowerbeds were arranged and renovated. Plants occupy about 40% of the site's territory, or almost 2,500 square meters.

The inventory of green spaces at the industrial site continues for the fourth year. During this time, scientists have evaluated more than 13,500 plants. In 2022, the survey covered 19.5 hectares. The main goal of the inventory is to maintain a stable ecosystem at the plant's territory.

Landscaping is also carried out in the city: in 2022, 3,000 new trees were planted together with the Miloserdiye Charity Fund. The fund's initial plans were to plant a tree for each of the 500 participants of the *Durable Alloy* race. However, the plan was exceeded and the fund donated more than 3,000 trees to the city.

Stoilensky restored 11 hectares of land

In 2022, Stoilensky rehabilitated more than 11 hectares of land of its tailings storage facility. Stoilensky conducts land reclamation annually. Environmental reclamation of industrial lands is one of the focal points of the Company's environmental protection activities. In just five years, the plant restored grass cover on an area of 60 hectares, or close to 100 football fields.

PLANNED BIODIVERSITY CONSERVATION PROJECTS

NLMK Group's Biodiversity Conservation Programme includes a number of measures planned for 2023, including:

▶ Planting seedlings on an area of 14.6 hectares at Stoilensky,
▶ Treatment of 17.7 hectares of forests at Stoilensky and Stagdok,
▶ Release of more than 10,000 fry at the Altai-Koks site for the reproduction of aquatic biological resources; and further survey and monitoring of biodiversity in cooperation with research institutes.

The Group regularly implements measures to rehabilitate land affected by the operations of its extractive companies. The treatment of deposit sites includes phased rehabilitation work to restore the landscape and its plant cover and to enable plants to grow again in the soil. [GRI 304-3] Reclamation programmes have been developed and are publicly available on the websites of the Mining Division companies. The programmes are being implemented as planned. In 2022, rehabilitation was carried out on 31 hectares of disturbed land.

Area occupied by Group companies and reclaimed land, ha

Indicator	2018	2019	2020	2021	2022
Occupied area*	11,973	11,973	11,918	11,906	11,926
Rehabilitated area	6	15	10	46	31

* The data has been adjusted in comparison with the Annual Report 2021.